Artur André Martinez Campos

Mestre em Educação - Novas Tecnologias, Educação e Trabalho
Universidade Federal de Sergipe - Brasil

Licenciado em Letras Português – Inglês
Universidade Federal de Sergipe – Brasil

Adopting smartphone applications for Second Language Acquisition: investigating readiness and acceptance of mobile learning in two Higher Education Institutions

Dissertação para obtenção do Grau de Doutor em Ciências da Educação

Especialidade em Tecnologias, Redes e Multimédia na Educação e Formação

Orientador e Vogal: Professor Doutor João José de Carvalho Correia de Freitas
(Professor Auxiliar da Faculdade de Ciências e Tecnologia - UNL **)**

Presidente: Professora Doutora Maria Paula Pires dos Santos Diogo
(Professora Catedrática da Faculdade de Ciências e Tecnologia – UNL)

Arguentes: Professor Doutor José Manuel Emiliano Bidarra de Almeida
(Professor Auxiliar da Universidade Aberta)

Professor Doutor Luís Sérgio Pinto Guerra
(Professor Auxiliar da Escola de Ciências Sociais da Universidade de Évora)

Vogais: Professor Doutor Nicolas Robert Hurst
(Professor Auxiliar da Faculdade de Letras da Universidade do Porto)

Professor Doutor José Maria de Castro Silva
(Professor Auxiliar do Instituto Universitário de Ciências Psicológicas, Sociais e da Vida)

Professor Doutor Carlos Francisco Mafra Ceia
(Professor Catedrático da Faculdade de Ciências Sociais e Humanas – UNL)

Professor Doutor António Manuel Dias Domingos
(Professor Auxiliar da Faculdade de Ciências e Tecnologia – UNL)

FACULDADE DE CIÊNCIAS E TECNOLOGIA
UNIVERSIDADE NOVA DE LISBOA

June – 2017

"Adopting smartphone applications for Second Language Acquisition: investigating readiness and acceptance of mobile learning in two Higher Education Institutions"

To the memory of my beloved Father, Luiz Carlos de Menezes Campos.

Acknowledgements

A doctorate is a long, lonely process, full of doubts and isolation, especially when you do it in a foreign country and away from family, home, friends and everything that defines who you are. But I was supported and encouraged by many people. I would love to express my profound gratitude for their generosity and assistance. Without you all, this work would not be possible.

First of all to my wife Marta Sá Freire Campos, thank you for the love, care, support, harmony and tenacity in our lives. You make me try to be a better man every day. Te amo !

Thank you to my mother, Idalina Martinez Campos, for her unconditional love and faith in me. Without her kind daily voice messages, these 3 years would seem longer. To my brother, Luiz Alberto Campos, for taking good care of our Mom and for his support on my dream.

I am grateful to my advisor, Professor João Correia de Freitas for his guidance and wise comments.

A particular thank you is due to the relevant participation of Professor Vítor Duarte Teodoro in helping this research with his technological and statistical wisdom.

The developed work would not be possible without the full commitment and support given by the Fellow Mundus Program of Erasmus, the acceptance of the project by Faculdade de Ciências e Tecnologia da Universidade Nova de Lisboa and the temporary license granted by my institution, Universidade Tiradentes in Aracaju, Brasil.

This work was also possible due to the contributions of Professor Carlos Ceia at Faculdade de Ciências Sociais e Humanas da Universidade Nova de Lisboa.

I thank the crew at the e-Learning Laboratory in FCT, in special to João Chamiço, João Mouro and Mário Souza for their continuous support and companionship.

For ethical reasons, I cannot publish their names but a big thank you note to all participants from Universidade Tiradentes and from Universidade Nova de Lisboa as much as to the administrative staff at both institutions.

Thank you all for making this dream come true.

Abstract

Both university scholars and school teachers have witnessed a growing presence of smartphones and tablets inside classrooms over the last decade. This doctoral investigation analyzed students' readiness and perception towards acceptance and adoption of smartphone applications for Mobile-Assisted-Language-Learning in English. Objectives were based on the importance of mobile learning nowadays and at verifying how second language acquisition applications were accepted and adopted by participants of this study held simultaneously at Universidade Tiradentes (Brazil) and Universidade Nova de Lisboa (Portugal).

Our first research question wanted to know if they were ready to the acceptance and voluntary adoption of virtual learning environments as a technology innovation, raising their awareness to the use of mobile apps as learning tools. A second research question analyzed which apps best contemplated participants' linguistic needs and could be suggested for curriculum development in higher education institutions in Brazil and Portugal. The five applications selected to our research were: Babbel, British Council, Busuu, Duolingo and Speak English Daily. Through an analysis of the selected applications for Second Language Acquisition (SLA), the Human-Computer Interaction (HCI) designed for L2 learning as well as the responses from participants it was possible to contribute to an adaptation of the unified theory of acceptance and use of technology which we labeled UTAUT+M; the M standing for mobile.

Elements of Connectivism are intertwined through this study and the convergence between m-Learning and SLA is perceived at the abundance of applications on the App Store (iOS) or Play Store (Android). The study was conveniently held at UNL, with graduates from Faculdade de Ciências Sociais e Humanas and Faculdade de Ciências e Tecnologia. At UNIT, participants were from the English Language, Petroleum Engineering and Biomedicine.

The approach was mixed with qualitative and quantitative aspects and our Design-based Research (D-bR) focused on understanding how participants made use of these apps and the potential to language acquisition opportunities they provide. Using a cross-sectional survey with convenience sampling, we collected data from volunteers at

the live presentations and also after a 60 to 90 days period to assess their use of the apps during it. Through descriptive statistics, we analyzed the data, coded it, separated in determinants and carried out frequency analyses of the attributes to better understand results and rates of acceptance and rejection from the sample. Our adapted UTAUT+M contributed to the understanding of the acceptance and potential adoption of mobile learning applications, which app could be recommended for curriculum development and how the contributions of this thesis can enhance English teaching and learning to these higher education graduates.

Keywords: Adoption of technology; mobile assisted language learning; English language acquisition; technology readiness; higher education.

Resumo

Professores universitários e do ensino regular têm testemunhado a presença crescente de telemóveis e tablets dentro das salas de aula na última década. Esta dissertação de doutoramento analisou a prontidão e percepção dos aprendizes em relação à aceitação e adoção voluntária de ambientes virtuais de aprendizagem em aplicativos para aprendizagem de línguas mediada por dispositivos móveis. Nossos objetivos estão baseados na importância do ensino com estes dispositivos atualmente e na verificação em como os aplicativos para aquisição de língua foram aceitos e adotados pelos participantes deste estudo realizado simultaneamente na Universidade Tiradentes (Brasil) e na Universidade Nova de Lisboa (Portugal).

Nossa primeira pergunta de investigação avaliou se os participantes estavam prontos para a aceitação e adoção voluntária de ambientes virtuais de aprendizagem, percebendo-os como ferramentas para a aprendizagem de língua inglesa. A segunda pergunta avaliou qual dos aplicativos selecionados melhor contemplou as necessidades linguísticas dos participantes e poderia ser sugerido como desenvolvimento curricular em instituições de ensino superior do Brasil e Portugal. Os aplicativos selecionados foram cinco: Babbel, British Council, Busuu, Duolingo e o Speak English Daily. Através da análise comparativa dos aplicativos escolhidos, da interface humano-computador de cada app e das respostas aos questionários nos foi possível formular uma adaptação à Teoria Unificada de Aceitação e Uso da Tecnologia, só que para dispositivos móveis, que ficou identificada como UTAUT+M.

Elementos do Conectivismo estão imbricados na convergência entre aprendizagem com dispositivos móveis e aquisição de segunda língua. Esta convergência foi percebida na abundância de aplicações nas lojas virtuais App Store (iOS) e Play Store (Android). O estudo foi convenientemente realizado na UNL, com alunos do Ilnova (Instituo de Línguas) da Faculdade de Ciências Sociais e Humanas e com alunos da graduação e pós-graduação da Faculdade de Ciências e Tecnologia. Na UNIT, nossa pesquisa envolveu turmas da graduação em Letras Inglês, Engenharia de Petróleo e Biomedicina.

A abordagem foi qualitativa e quantitativa e nossa pesquisa baseada em Design focou na compreensão de como participantes fizeram uso dos apps e do potencial para aquisição de língua que estes promovem. Utilizamos uma pesquisa de corte transversal e com amostragem por conveniência, coletamos dados dos voluntários na apresentação da pesquisa e após 60 a 90 dias de utilização dos aplicativos para entender como foi esta adoção. Através de estatísticas descritivas, analisamos os dados, codificamos, separamos em determinantes e desenvolvemos uma análise de frequência dos atributos para entender melhor os percentuais de aceitação e rejeição da amostra. Nossa adaptação da UTAUT+M contribuiu para a aceitação e adoção potencial de aplicações, verificou qual aplicação poderia ser recomendada para o desenvolvimento curricular e como esta tese podem enriquecer o ensino e aprendizagem de Inglês a alunos do ensino superior.

Palavras-chave: Adoção de tecnologia; ensino de línguas assistido por dispositivos móveis; aquisição de língua inglesa; prontidão tecnológica; educação superior.

Contents

List of Figures

List of Tables

List of Acronyms

A – Available

AA – Acceptance and Adoption

ASR – Automatic Speech Recognition

AVA – Ambiente Virtual de Aprendizagem

BBC – British Broadcasting Corporation

BYOD – Bring Your Own Device

CALL – Computer Assisted Language Learning

CAPES – Comissão de Aperfeiçoamento de Pessoal do Nível Superior

CD – Compact Disc

CEFR – Common European Framework of Reference for Languages

CNPq – Conselho Nacional de Pesquisa

D-bR – Design-based Research

DVD – Digital Video Disc

EDaPECI – Educação a Distância e Práticas Educativas Comunicacionais e Interculturais

EE – Effort Expectancy

EF – Education First

EFL – English as a Foreign Language

EHEA – European Higher Education Area

ELE - English Language Education

ELL - English Language Learners

EPI – English Proficiency Index

ESL – English as a Second Language

FC – Facilitating Conditions

FCSH – Faculdade de Ciências Sociais e Humanas

FCT – Faculdade de Ciências e Tecnologia

FRAME – Framework for the Rational Analysis of Mobile Learning

GUI – Graphical User Interface

HC – Hindering Conditions

HCI – Human-Computer Interface

HEI – Higher Education Institutions

IBM – International Business Machines

ICT – Information and Communication Technology

ID - Identification

IDT – Innovation Diffusion Theory

ILNOVA – Instituto de Línguas da Universidade Nova de Lisboa

iOS – Apple's mobile operating system

IPA – International Phonetic Alphabet

KP – Knowledge and Persuasion

L2 – Second Language

LAD – Language Acquisition Device

LMS – Learning Management Systems

LR – Linguistic Relevance

MALL – Mobile Assisted Language Learning

MIE – Minimally Invasive Education

MIT – Massachusetts Institute of Technology

MLE – Mobile learning Environment

NA – Not Available

PC – Personal Computer

PDA – Personal Digital Assistant

PE – Performance Expectancy

PEU – Perceived Ease of Use

PhD – Doctor of Philosophy

PIBID – Programa Institucional de Bolsas de Iniciação à Docência

PLATO – Programmed Logic for Automated Teaching Operations

PR – Potential Re-Adopter

PU – Perceived Usefulness

PUC-RJ – Pontifícia Universidade Católica do Rio de Janeiro

RJ - Rejection

SI – Social Influence

SLA – Second Language Acquisition

SPSS – Statistical Package for Social Sciences

SRL – Self-Regulated Learning

TAM – Technology Acceptance Model

TOE – Technological, Organizational and Environmental

TPB – Theory of Planned Behavior

TR – Technology Readiness for m-learning

TRA – Theory of Reasoned Action

TRI – Technology Readiness Index

UFS – Universidade Federal de Sergipe

UK – United Kingdom

UNIT – Universidade Tiradentes

UNL – Universidade Nova de Lisboa

USA – United States of America

USD – United States Dollars

UTAUT – Unified Theory for the Acceptance and Use of Technology

UTAUT+M – Unified Theory for the Acceptance and Use of Technology for Mobiles

VHS – Video Home System

VLE – Virtual Learning Environments

VU – Voluntariness of Use

ZPD – Zone of Proximal Development

1 Introduction

1.1 Contextualization

Through the last two decades, both university scholars and school teachers have witnessed an increasing presence of smartphones and tablets inside classrooms, almost to a level of ubiquity. However, on the last eight – ten years, this mobile presence has increased to standards of use in our lives only predicted by some science fiction movies years ago. Social media and communication applications have transformed the use of smartphones to a new pattern and the spawn of apps for every function is confirmed by a simple browse at the application stores available online. This doctoral investigation was performed within this digital panorama which invades classrooms worldwide. As an English Grammar and Literature university teacher, one of the authors started paying special attention to the growing number of dictionaries and thesaurus applications at Apple and Android stores and put them into usage during my Universidade Tiradentes graduation classes in 2012 in Sergipe, Brazil.

We decided to implement linguistic solutions using Information and Communication Technology to my university students through a more intense use of Virtual Learning Environments (Anderson, 2008; Laguardia, Portela & Vasconcelos, 2007; Oliveira, 2004) available from digital dictionaries such as Farlex or thesaurus apps like Advanced English. Learning performance of the students improved as expected from results of similar studies (Evans, 2009; Park, 2014); especially concerning unfamiliar vocabulary acquisition (Alda & Leffa, 2014; Pulido, 2003; Wu, 2015) and their determination to go after more complex language items (Krashen, 1981). This new “linguistic interaction” (Zhang, 2012) for searching vocabulary proved to be more comfortable to them. After students used those apps with positive results on linguistic acquisition of vocabulary and grammar elements, one of the authors started to ponder if this was an issue worth a doctoral investigation. The most complex difficulties perceived in beginners learning the English language generally range from acquiring familiarity with the grammar rules to memorizing vocabulary. After designing a research project accepted by the Fellow Mundus Program (funded by Erasmus Mundus)

and approved by Universidade Nova de Lisboa, we developed this work regarding the use of mobile learning in higher education. Could this be an opportunity for better language learning? What applications were available for this purpose? From this starting problem, we established two major research questions in this PhD study:

#1 - Are graduate students ready to the acceptance and adoption of mobile technology through Virtual Learning Environment applications available to smartphones and make use of them as English language learning tools?

#2 – Which of the SLA applications best served to participants' needs with the English language and is recommended for curriculum development in higher education institutions?

This readiness (Parasuraman & Colby, 2015; Pollara, 2011; Souza & Luce, 2005) in using applications for Second Language Acquisition – SLA (Cavalari, 2011; Krashen, 1981; Tonoian, 2014; Vygotsky, 1986) was determined through questionnaires scrutinizing their profile, linguistic proficiency, technology readiness, rate of adoption and usage as well as opinions about the applications that they used for 60-90 days. Apps were selected by us due to their human-computer interaction ergonomic criteria (Assila, Oliveira & Ezzedine, 2014; Bastien & Scapin, 2003; Weller, 2007) coupled with the high number of downloads in App Store (iOS), Play Store (Android) and Windows Store. With this investigation, we wish to contribute to the development of an innovative and alternative methodology in learning English to be applied in Higher Education Institutions of Brazil and Portugal.

The main outcome of this doctoral study is to evaluate whether UNL and UNIT students are ready, and perceive tablet or smartphone applications as adequate, for educational potentialities, especially when using VLEs (Anderson, 2008; Dyson & Campello, 2003; Veletsianos, 2010; Weller, 2007) designed to English learning. Among the innumerous applications available and possibly considered for this study, we selected Babbel, British Council, Busuu, Duolingo and Speak English Daily, five applications which together have more than 200 million downloads worldwide, a figure that represents the relevance to the apps. Our research focused on this current second language acquisition possibility – learn from an app – in both universities and to a possible curricular use of them into the English Language Graduation of Universidade Tiradentes – a 50-year-old Brazilian university.

This mobile learning experience (Anderson, 2008; Kenning, 2007; Moura, 2011; Traxler, 2009, 2013; Vieira et al, 2014) for language acquisition occurs inside and outside of class (Kukulska-Hulme, 2009, 2012; Tonoian, 2014); it is learner-centered (Anderson, 2008; Zhang, 2012) and thoroughly "ubiquitous" (Sampson, Isaias, Ifenthaler, & Spector, 2013; Valk, Rashid & Elder, 2010). Elements of Constructivism are present as learners use some form of prior knowledge over which new knowledge is built upon by themselves (Bruner, 1996; Vygotsky, 1986).

Connectivism (Downes, 2012; Mattar, 2013; Siemens, 2006) is also intertwined on the theoretical framework of this doctoral study as students take learning from "non-human appliances" and also "across a network of connections and therefore that learning consists of the ability to construct and traverse those connections" (Downes, 2012), as we could see on Babbel or Busuu. The relevance of this investigation may be assured by the convergence of m-Learning and SLA perceived by the high interest on these particular apps, both by the abundance and the staggering number of downloads (+ 200 million in 2016, Source: sensortower.com) on the App Store (iOS), Play Store (Android) and Windows Store.

Starting by being an Assistant Professor I at UNIT and becoming a Doctoral student in Educational Sciences at UNL, we developed this investigation within the boundaries of these two higher education institutions. At Universidade Nova de Lisboa, we created opportunities for this Mobile-Assisted-Language-Learning (MALL) into the ILNOVA-FCSH (Instituto de Línguas da UNL) and at FCT with its E-Learning Laboratory with the research and applications' characteristics presented in classrooms, one-on-one explanations and data gatherings in both unities of UNL. At UNIT, we performed our research with all graduation students of the English Language department and also with a reasonable number of attendees from two other courses of the institution: Petroleum Engineering and Biomedicine. The investigation consisted of making students aware of the applications' existence, suggesting to them the download and adoption of one or more apps. After this initial step of downloading an app or apps, they could make a pedagogical use of them as learning tools via self-regulated learning strategies (Carneiro, Lefrere, Steffens & Underwood, 2011; Dabbagh & Kitsantas, 2012) during the period of 60 to 90 days.

1.2 General panorama of the research and Dissertation structure

This investigation is the result of a thorough review of the state-of-the-art literature as well as the experiment conducted on the diffusion, adoption and use of second language acquisition applications by the participants. The research dealt mostly upon new paradigms and conceptual ideas of mobile learning (Sharples, Taylor & Vavoula, 2010; Traxler, 2009, 2015) and Connectivism (Siemens, 2006). The main objective of this dissertation resided on verifying the readiness index (Parasuraman, 2000) to the adoption and the frequency of use of SLA apps by the participants who were all university graduates (N = 113; 96 from UNIT; 17 from UNL) in Brazil and Portugal. The outcome may help future projects on implementing applications (apps) as a support for SLA in UNL or even into the syllabus of the English language graduation course of Universidade Tiradentes, since its utilization was analyzed in detail and scrutinized under the prerogatives of such a doctoral investigation.

Different domains of knowledge (Siemens, 2006) were involved in this work having in mind the improvement of the possibilities for learning English. With their massive use by the majority of graduate students today in both countries, smartphones and tablets are the next realm of educational tools in higher education and an emergent theme in pedagogical research. This investigative quest adds some importance to the field as the relevance of it residing on the fact there are not many studies on the subject in Brazil and Portugal. Finally, it is important to mention the undeniable help established by the ownership factor for the participants involved. They all (100%) had a smartphone and could fulfill this technological instrumental condition and therefore, participate in this empirical study.

As limitations for the investigation, we can mention the financial constraints to revisit Brazil after questionnaires were answered, logistics aspects involving two countries, different calendars between UNIT and UNL and, out of our control, the fast pace of transformations in the smartphone and applications industry and its consequences. Nonetheless, it is a study that certainly has its place at educational discussions of today and that was worth the execution.

The structure of the dissertation is organized in seven Chapters. In Chapter 1, we find the Introduction distributed into contextualization, the general panorama of the

research identifying the problem and research questions and the structure of the study followed by a methodology overview.

In Chapter 2, we develop a literature review discussing the educational perspectives of post-modernity as well as the effects that the digitization of education is bringing to the knowledge society (Hargreaves, 2003). The main concepts of mobile learning, their authors and diverse perspectives were presented on this segment allied to the understandings of what define the App Generation. Everett Rogers (1983) and his Innovation Diffusion Theory compose an important part of the discussion also exposed on this Chapter as understanding acceptance, adoption, rejection of the apps and other concepts permeate this journey and are the overall objective of the work. We include an analysis of some effects of the Bologna Process and the European paradigm established to Portuguese educational institutions and an overview of the most prominent works and authors dealing with mobile learning in Portugal. Closing the discussion in Chapter 2, a review of the Brazilian critical mass developed in some studies on mobile learning and the most relevant academic contributions published in Sergipe, Brazil.

Chapter 3 displays a thorough review of learning theories focusing on the most recent studies related to wireless technologies and its pedagogical effects. Starting from Behaviorism and its "black box", we develop a review of concepts and principles belonging to Cognitivism and then open the discussion to Constructionism. The theoretical analysis of learning theories is concluded with the next theory involving modern educational experiences, ubiquitous technologies and its consequences; Connectivism. It is also included on this Chapter 3, an analysis of higher educational institutions and the process of ICT implementations they face today which demand a perception of readiness to the adoption of m-Learning practices. We evaluated the new role of teachers and educational institutions after the massive entrance of ICT in learning practices.

Also on Chapter 3, we present our original contribution as a PhD work formulating a proposal for a Unified Theory for the Acceptance and Use of Technology (Venkatesh & Davis, 2000; Venkatesh et al., 2003) but for mobile use which we entitled UTAUT+M. We delineated a convergence of theories finding attributes at the Technology Acceptance Model (Venkatesh et al., 2003), Innovation Diffusion Theory (Rogers, 1983) and Technology Readiness (Parasuraman, 2000) to establish determinants that have a

positive influence into the acceptance and adoption of the mobile applications. We close this Chapter verifying issues related to how apps can contribute to the design of curriculum development.

Second language acquisition and its relationship with mobile assisted language learning (MALL) are the starting point of Chapter 4. Here, Applied Linguistics enter the investigation in a more 'molecular perspective' and we developed an overview of it focusing on L2 Acquisition. We undertook a historical journey revisiting technologies that helped SLA since the phonograph to our current mobile apps. These are the roots of Mobile Assisted Language Learning (MALL) and we devoted special attention to some of the most downloaded ones worldwide containing resources for English learning. In order to understand these applications in an intense relationship to language learning objectives, we verified elements to an ergonomic analysis of the human-computer interface of these SLA mobile apps. Chapter 4 finishes with a comparative analysis involving Babbel, British Council, Busuu, Duolingo and the Speak English Daily applications.

Chapter 5 is where the methodology of the study is presented in detail from the choice of a mixed method involving both qualitative and quantitative approaches to why use a cross-sectional survey with a convenience sample. It reveals the characteristics and reasons for establishing a Design-based Research as the best option design for this PhD investigation as well. We end Chapter 5 with the explanation of determinants, variables and attributes that compose the UTAUT model and how we formulate our contribution to an added mobile component, resulting on the UTAUT+M that we propose to answer the research questions.

Chapter 6 explains the selection of participants and the structure of the questionnaires as much as it delivers the results and statistical analysis of the data collected which, intertwined with the literature, composed the elements for the conclusions in the next Chapter.

Conclusions are presented in Chapter 7, the last one, together with the outcomes to answer the research questions and provided a holistic perception of the work developed. The end of Chapter 7 is composed by the limitations of the work and the suggestions for further research. At last, Reference and Annexes are presented to illustrate the literature analyzed and the questionnaires used by participants.

1.3 Methodology Overview

The methodology for this investigative research was qualitative on its approach and resting on statistical analysis of some of the data. It was established through a cross-sectional survey with a convenience sample. This mixed method is a recommendation of Creswell (2012) as researchers gain from the unique strengths of each angle and also decrease limitations of using a single methodology. Participants responded to questionnaires to discover the significance on the acceptance and adoption of SLA mobile applications and achieve some linguistic improvement.

As this doctoral investigation happened simultaneously at two universities in two different countries (Portugal and Brasil), methodology may have suffered from hampering issues such as academic calendars and schedules, procedures and regulations, financial limitations and expensive logistics that somehow might have interfered on results. Nevertheless, authors like Creswell (2012) and Phakiti (2014) mention that for researches involving geographical distance from participants it may be better to use electronic interviews and questionnaires. We provided Google Forms to collect answers and also printed ones for the live presentations of the study. Participants entered the research in a volitional manner as invitations to join were made after the presentations. Initial questionnaires #1 was answered by 188 participants, #2 and #3 was answered by 173, as we had the first (15) drop outs.

We used a Design-based Research – D-bR (Barab & Squire, 2004; Herrington, McKenney, Reeves & Oliver, 2007) due to the empirical nature of understanding alternative methods, especially for teaching and learning researches. As a cyclic methodology, D-bR holds great promise for enhancing both the theoretical contributions and public value of educational technology research. D-bR is divided into four main phases: Analysis of Problems, Development of Solutions, Iterative Cycles of Testing and Reflection to enhance Solutions. After the four phases of our D-bR, participants answered to the most important questionnaire – Questionnaire 4 which expressed which application(s) participants were using, for how often and the negative aspects of using smartphones to learn English. From the 173 initial participants, we only received 113 answers to Q4. However, these responses provided enough evidence from values and percentages to comprehend if the determinants of our UTAUT+M reflected

on a positive influence to the acceptance, adoption or rejection of the mobile applications.

We used *the IBM SPSS* software for *Windows* and *Microsoft Excel* from *Microsoft Office* for the analysis of the data which involved the elements measured such as Gender, Age, Institution Affiliation, Proficiency Level, Reason to Study English, Time available to use the Apps, Performance Expectancy, Linguistic Relevance of the idiom, Readiness for m-Learning, Conditions that hinder adoption and others. These attributes helped the researchers to understand how partakers used the smartphone as a learning tool. We also asked how well they understood the research objectives and the applications' features on presentations. After analyzing these data, we came to conclusions based on these determinants and reference authors as it is available in Chapter 7.

2 Education in contemporary times: mobile applications into knowledge acquisition

2.1 Post-modernity and Educational perspectives

With the entrance of society in post-modern or post-industrial times (Bauman, 2001; Candeias, 2009; Halsey, Lauder, Brown & Wells, 1997), a historical period with several intrinsic characteristics that include a variety of globalization processes and a complete redesign of values and beliefs, it has also been possible to identify a highbrow debate on what education should really be devoted for. There are new methods of information gathering and sharing being developed and they may lead people, in a utopian scenario (Milojevic, 2003), to the same work opportunities generated by knowledge acquired through formal education institutions. Amidst all this, we have the ubiquitous presence of digital tools in our daily lives that may bring us closer to this "educational utopia" (Milojevic, 2003; Papert, 1996; Peters & Humes, 2003). On this research, we tried to avoid binary, dichotomous approaches (Horst & Miller, 2013) that drive us away from "the complexities and the contradictions of socio-technical activity and educational change" (Milojevic, 2003, p. 11), but it might be reasonable to establish some differentiations between Modern and Post-modern.

One of the possible ideas that characterize this distance between Modernism and Post-modernism in education may be the major focus on lifelong learning by the latter or the inclusion of more contemporary approaches (Brown & Mbati, 2015) to pedagogical routines that display "a different way of seeing and working, rather than a fixed body of ideas…or a set of critical methods and techniques" (Usher & Edwards, 2003, p.2). As a theory of grand narratives Post-modernism encompasses many of the necessary concepts that illustrate "the present state of the world…saturated with information and communication" (Kumar, 2005). The debates over these epistemological differences, intrinsic qualities and possible deterrents of Modernism versus Post-modernism abound in the literature however the core of our observations were reduced to the educational horizon.

Seen by Drucker (1993) as the key to future economic prosperity, education and, in special, its academic discussions are assessing "the relative consequence of secular changes in the nature of post-industrial or post-modern societies" (Halsey et al, 1997, p.20). As Candeias (2009) understands, educational systems are a fundamental process for socialization in Modernity, a mental and "philosophical labor" that helps the mobility desire of the underprivileged. This Portuguese educational scientist has devoted part of his career to the study of sociological matters concerning Educational issues and amplified the discussion that educational access and development is in transformation because society started "progressivamente desde pelo menos o século XVIII, exigir a todos o que antes se exigia apenas às elites, ou seja, formas de socialização progressivamente institucionalizadas e cognitivamente muito complexas" (Candeias, 2009, p. 10).

This cognitive complexity is augmented by technology today as we are surrounded by multiple necessities of human – machine interactions, be it at the ATM machine for some cash or to score a job at a junior level position. From everyday communication with family and friends to making deals online via Skype, Google Hangout or Facebook Messenger, what we see in society today is a tech-discontinuity (Weller, 2011) based on a complex perception of time acceleration and on concepts of cities and villages (local, global, glocal) that overcome physical or geographical borders. We also see high demand for innovative production processes which are remodeling contemporaneous education to the handling "of meanings" (Candeias, 2009) as opposed to a random memorization of facts and figures. And these meanings are more and more transmitted to the humans involved via ICT.

Technology-wise, Bauman (2001) refers to this issue when he dives into hardware and software influences in society considering them "heavy" or "light" in a discourse that is hard to disagree from. According to him, in software times as we live today, society is focused on efficacy, in less time as possible for a task having objectivity as one of the main goals. According to him, the consequences of this behavior could be a world of "exhaustion and lack of interest" (Bauman, 2001, p. 137). That said, we believe the Polish author aced the topic when he predicted that the instantaneity of softwares would take away the relevance of Space. If we see this Baumanian concept applied to modern education and to the spawning proliferation of e-Learning experiences

(Downes, 2005; Veletsianos, 2010), Bauman has proven himself correct. To the author, humans understand the world in a praxeomorphic way (Bauman, 2001) – determined by the 'know how' of his/her time. If mastering the use of ICT and portable devices is a must in today's world, educational institutions and specially, higher education institutions, as the last step of formal education before someone joins the work market, have to incorporate their use and domain to the students enrolled. In Chapter 3 of this study, we presented a contribution about the 'outside-school-walls' mentality (Zhang, 2012) that should be observed for using mobile apps in learning.

Modernists and postmodernists have argued about definitions which somehow delineate borders and boundaries; in a search of proper characterizations to ease navigating through our current society "now defined, and named, by its novel methods of acquiring, processing and distributing information" (Kumar, 2005). This information acquisition has defined our historical period and we witness renewed understandings of what gathering knowledge (Liaw, Hatala & Huang, 2010) really represents nowadays and its aftermath to social success in contemporary societies. Add to that, the relevance the web implemented to political, social and educational transformations of modern life and there is a new world in shape. To Kumar (2005), contemporary societies show nowadays "a new and heightened degree of fragmentation, pluralism and individualism...with changes in work organization and technology (p.98)". Opposing views of experts dealing with the information society see the relationship Human Being x ICT as an expansion of our human capabilities (Lawson, 2010) whereas others see it as a procedure that creates a diminishing role to individuals who are overwhelmed by a "flood of digital tools" (Bauerlein, 2011) now scattered in simple daily activities.

Nevertheless, we still find the discourse about the 'miracle of modern technology' from the XX century in place when those who advocate the uber-presence of the web in our lives would guarantee "prosperity, security and opportunity" (Halsey et al., 1997). Postmodernist principles are fond to the idea of enhancing our existence through machine-using, be it at work, through our social lives and mainly in universities and high schools; playing on the arena of what the German philosopher Jürgen Habermas (1984) denominated Rationality.

Certainly, Habermas' ideas go way beyond the scope of humankind x rationality as his writings cover issues of human development, public politics, social theory and

others. He built a strong criticism of technology as ideology and, up to today, he is concerned about technological influences on human dignity. However, the author reinforced in his writings about a philosophical and academic importance that should be given to everyday existence and its realities. The ownership of a multitude of gadgets that are all connected to the web is part of our current society, hence smartphones, tablets and notebooks carry on themselves loads and loads of possibilities; learning a foreign language being only one of them. Taking this aspect to the study developed here, the one thing to do is to convince teachers, high school students, professors and college graduates that efficient linguistic acquisition can be helped through an insightful and active use of cell phones. In the words of the philosopher,

> purposive activity also attains a higher level of rationality. When truth claims can be isolated, it becomes possible to see the internal connection between the efficiency of action oriented to success and the truth of empirical statements, and to make sure of technical know-how. Thus practical professional knowledge can assume objective shape and be transmitted through teaching. (Habermas, 1984, p. 195)

Habermas (1984) also conveys the idea that our social experiences are a reflex of our cognitive horizon and that they are expressed through our linguistic competences. Learning a second language (English) expand the horizons of participants to a different standard (Engeström, 1987), possibly creating better graduation and work opportunities in other countries. The calling for a wholesome transformation in educational horizons in this (Post) Modernity could re-assess the 'ethos' of educational institutions (Ramos & Espadeiro, 2014; Robinson, Minkin & Bolton, 1999) and put into practice more digital literacy in classrooms (Leu et al., 2004). When Gatti (2005) deals with Habermas ideas reminding us that modernity is "pensar e produzir progresso" (Gatti, 2005, p. 597), we understand the reverberation to Economics and possible financial rewards to the ones who learn the language. If to learn the idiom it is mandatory that you "think in English" (Tonoian, 2014; Liao, 2006), so while involved with the apps participants are developing their cognitive domain (Jarvis, 2008) and the acquisition of English proficiency.

As a matter of fact, the idiom is seen as a path to career development and post-graduation by most of the participants as the data collected showed to the authors. They see English as the current lingua franca for business, academics and working requirements be it in Portugal or Brazil. To illustrate and go a little further on the thought, on Figure 2-1 below we see the relationship between English proficiency and some countries' gross national income per capita on data provided by the United Nations in 2013. Updating the numbers to 2016, Portugal stands at USD 21,700.00 (dollars/year) and Brazil in a more uncomfortable situation stands at USD 11,200.00 (dollars/year).

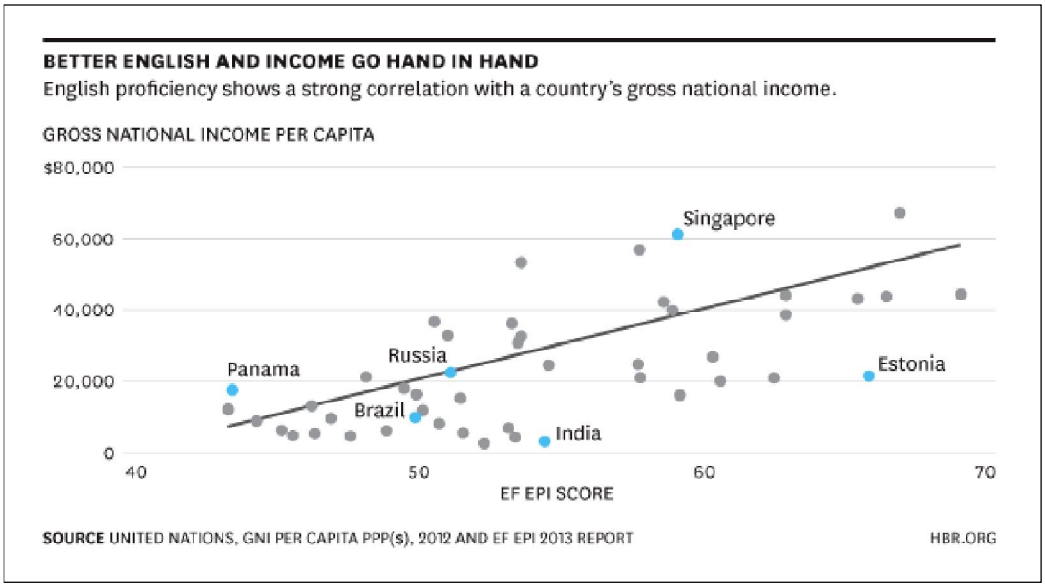
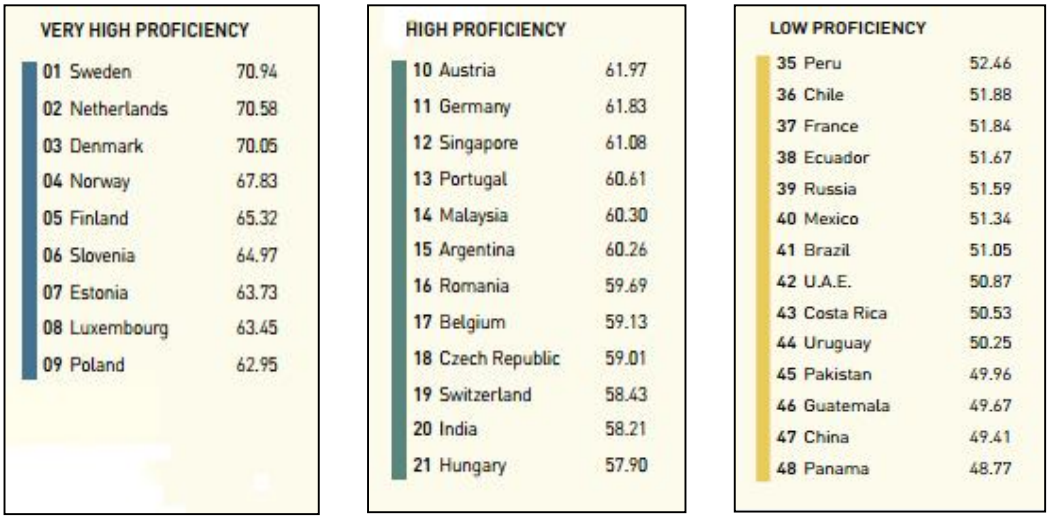


Figure 2-1: English Proficiency x Gross National Income. (Source: United Nations - 2012)

Although this relationship Income x English Proficiency reveals the importance of the language nowadays, this is not the only element that takes salaries and wages to improve. Detailing the levels of proficiency from the two countries involved, according to Education First English Proficiency Index 2015, a rank of countries established by English language skills amongst those adults who took the EF test, Portugal stands at the 13th position worldwide and it is considered of High Proficiency. Although criticized for some limitations, EF index is respected by most institutions and companies.

Unfortunately, Brazil stands at the 41st position in the index and part of the Low Proficiency group as seen on Figures 2-2, 2-3 and 2-4 below.



VERY HIGH PROFICIENCY	
01 Sweden	70.94
02 Netherlands	70.58
03 Denmark	70.05
04 Norway	67.83
05 Finland	65.32
06 Slovenia	64.97
07 Estonia	63.73
08 Luxembourg	63.45
09 Poland	62.95

HIGH PROFICIENCY	
10 Austria	61.97
11 Germany	61.83
12 Singapore	61.08
13 Portugal	60.61
14 Malaysia	60.30
15 Argentina	60.26
16 Romania	59.69
17 Belgium	59.13
18 Czech Republic	59.01
19 Switzerland	58.43
20 India	58.21
21 Hungary	57.90

LOW PROFICIENCY	
35 Peru	52.46
36 Chile	51.88
37 France	51.84
38 Ecuador	51.67
39 Russia	51.59
40 Mexico	51.34
41 Brazil	51.05
42 U.A.E.	50.87
43 Costa Rica	50.53
44 Uruguay	50.25
45 Pakistan	49.96
46 Guatemala	49.67
47 China	49.41
48 Panama	48.77

Figure 2-2, Figure 2-3 and Figure 2-4: Education First English Proficiency Index, 2015: positions of Portugal - 13th and Brazil - 41st (Source: EF EPI 2015)

These positions were from 2015 and significant changes did not take place after that. The disadvantage Brazil has yet to overcome may have resulted in higher interest by Brazilian participants in the study. Another attribute that has a strong resonance to this work is the relationship between English proficiency and internet connectivity. In countries with higher proficiency in the language, internet use by population is higher as seen on Figure 2-5 below. Yet according to EF, most of this upcoming connection between the language and internet access is to be performed on smartphones, with a prediction of "more than two billion English language learners to access online learning tools that make English learning more individualized, more interactive, and more accessible (EF, 2015)." This correlation is illustrated through the percentage of internet connectivity and English proficiency in different countries; displaying another benefit that mastering the language may aggregate.

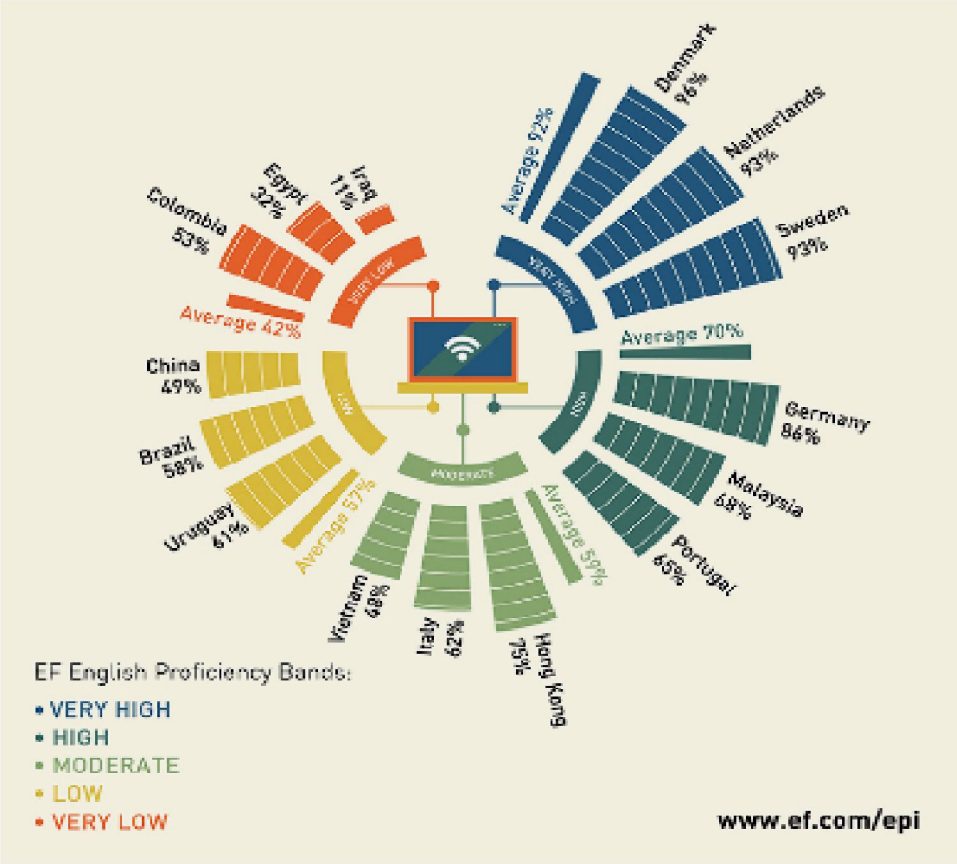


Figure 2-5: The correlation English proficiency and percentage of Internet connectivity. (Source: Education First EPI 2015)

As we perceived the correlation between English proficiency and internet access generating benefits to the ones who understand the language, we have to ponder over the technological aspect involved on this relationship. The comprehension of the language is only part of the formula, mastering ICTs and their infinite possibilities are the other half necessary to a successful combination. This aspect cannot be set aside when conceptualizing understandings for education in Contemporaneity, especially when or if it involves computers and societies.

For Heidegger (1977), this perspective on the Techné is a “skilled and thorough knowing that disclosed...a mode of bringing forth into presence, a mode of revealing” (Heidegger, 1977, p. xxv). The sheer power of some of his ideas corroborates our objective of implementing mobile apps in learning or in classes because when commenting about technology, the author asserted that “their important quality has become their readiness for use” (Heidegger, 1977, p. 29). As Heidegger (1977), some

scholars have dedicated their work to the concepts and influences of educational development into the human being and at global Economy, intertwining causes and results for investments on this agenda.

As usual, many studies are still required for a complete diagnosis of ICT impacts in education. Under the principles of Heidegger (1977), it is possible to have an understanding of Technology as a "realm where revealing and unconcealment take place, where truth happens" (Heidegger, 1977, p. 13). Another Heideggerian idea refers to Instrumentality, in our case here to the smartphones and their multiple uses in current days, which could be understood as "the fundamental characteristic of technology" (Heidegger, 1977, p. 13).

University scholars and school teachers are aware that using technology in our classroom routines must go beyond the basic digitalization of familiar procedures and achieve a higher ground, where students create individual knowledge (Liaw, Hatala & Huang, 2010; Santaella, 2009), but which route to take? On the literature, university campi and symposiums there is a consensus on advocating ICT to reinvent pedagogical processes but not enough 'scientifically-proved' change has been produced so far. We have to investigate as many possibilities of using mobile learning (Traxler, 2013; Kukulska-Hulme, 2009) as possible and we, university professors, must adopt smartphones and tablets in class, the same way we have adopted them into our lives. Research in educational areas must shine light over when and where the 'techné' is put into practice and observe all answers. "The essence of modern technology is adequately found out through questioning" (Heidegger, 1977, p. 23)

Post modernity concepts, values, economy, society, education are all experiencing "the coming to presence of technology" (Heidegger, 1977, p.35) through a redefinition of paradigms and boundaries. ICT has spread to sectors no one imagined and we are still numb, senseless at how fast all these changes have happened. Back to an educational perspective, Candeias (2009) analyzed some ideas of Gellner (1993) pointing to the current need of comprehension by decision-making personnel inside our schools, universities and enterprises to the fact that "o trabalho já não representa a manipulação dos objectos, mas dos significados, e (...) assentam numa ideia de crescimento constante que depende do desenvolvimento cognitivo" (Candeias, 2009).

This cognitive development resides in meanings permeated by the full perception of rethinking education apart from 'Schooling' (Collins & Halverson, 2009; Siemens, 2006). Most of human knowledge is available on the web today, so pedagogical pillars are down to a new reconstruction. The marbled libraries are being forced to rethink their existence by Amazon.com and 'pdf files' available online for free. Needless to say, Post modernity has generated some quintessential elements and the Knowledge society (Hargreaves, 2003; Castells & Cardoso, 2005) is one of them; where application of knowledge requires a different approach to what has been practiced before the 1970's, 80's when computers really started changing the way we live.

The knowledge gathering necessary to execute a function or a job position nowadays has been transformed by ICT and, as a natural reaction; education suffered demands to the need of transformation as well. Gilbert (2007) inserts the term "knowledge" on her writings meaning the term now works as an adjective for a number of nouns such as "knowledge management, knowledge work, knowledge resources, knowledge workers" (Gilbert, 2007, p.4) moving away from its traditional philosophical understandings.

We are building a new era, a knowledge-based society which aims at the enhancement of many familiar activities due to a remodeled format brought by these same activities in digital versions. Knowledge is not anymore "a kind of thing, a kind of matter produced by human thought and then codified into disciplines" (Gilbert, 2007, p. 5) but the result of some form of effectiveness that acts upon a solution for a problem. It is fluid, dynamic and borderless. For Castells & Cardoso (2005), it is the result of "multidisciplinary and distributed teams" or the result of what happens from the relationships between people, their "creativity and ingenuity" (Hargreaves, 2003).

There is not only a positive side for these recent educational practices, though; knowledge society has put some burden on teachers' back as they constantly deal with and dodge test results, targets to fulfill and endless accountability processes (Hargreaves, 2003). Other aspect to mention is that the knowledge society is making teaching a profession destined to young adults because of ICT needs to fulfill positions. Those teachers and professors will be preparing kids and adolescents for the workplace in 20, 30 years and we may not be so certain of what will be required by then. Hargreaves (2003) also points to hassles that teachers suffer while immersed in the

reality of everyday school bureaucracy (Ceia, 2013) in postmodern times. For Hargreaves (2003), teachers' routine has been "a dispiriting world of micromanagement, standardization, and professional compliance in which demands have increased, resources have been scarce, and public trust has been wanting" (Hargreaves, 2003, p. 73). Indeed if we consider that teachers and professors have to prepare students for a future we cannot predict and that cognitive aspects are also constantly changing, not to mention the frequent "one-size-fits-all" approach to education, it is clear these are issues that must be addressed by contemporary education.

2.2 Knowledge Society: the Digitization of Education

As it was mentioned, knowledge society is represented by aspects which include the uber-presence of technology and the necessity of a highly skilled labour force (Halsey, Lauder, Brown & Wells, 1997) who understands information provided by digital components in "order to complete organizational tasks" (Downes, 2012, p.378), at work or in a learning environment (Blake, 2008; Dyson & Campello, 2003). Consequently, the reconceptualization of educational principles due to the entrance of ICT has been under analysis over, at least, the last two decades. First computers, and now smartphones and tablets have brought new possibilities for pedagogical approaches to teaching and learning, and specifically to our topic, altering the ways someone can acquire knowledge of a foreign language (Beatty, 2010; Chen, 2013; Kukulska-Hulme, 2009, 2012; Lobato, 2013).

People can put in progress an autonomous use of virtual learning environments (Anderson, 2008; Dyson & Campello, 2003; Veletsianos, 2010; Weller, 2007) focused on many different subjects and learn by him/herself; a second language (Hoy, 2011; Krashen, 1981; Kukulska-Hume, 2009; Vygotsky, 1986). The sheer number of L2 acquisition applications available on the Virtual Stores (iOS, Play Store or Windows Store) and an analysis over numbers demonstrates they are downloaded in millions lately. Among the users we may include people of all walks of life, university graduates (Oblinger, Oblinger & Lippincott, 2005), and not only English language course majors.

According to Prensky (2001), a significant amount of these graduates of today are most Digital Natives (Moura, 2011; Prensky, 2001; Siemens, 2005) and avid users of smartphones and tablets; consequently, they "think and process information fundamentally differently from their predecessors" (Prensky, 2001, p.1)

Detailing a little further the concept of digital natives (Prensky, 2001), the author asserts that we are in a moment of discontinuity in education with ICT entering pedagogical processes like never before. Add to that the fact this is the first generation of students from "K through College…to grow up with this new technology" (Prensky, 2001, p.1). According to the author, there is a redesigned process of acquiring information by this generation since they were submitted to innumerous hours of video, TV and computer time. Although not yet completely proven by literature, this modification in brain processing (Peña-Ayala, 2014) certainly is somehow affecting instructional methods (Valk, Rashid & Elder, 2010).

As native speakers of the "digital language" and used to ICT, these students do not see themselves represented on lecture classes of the institutions they attend when these lectures are conducted by "digital immigrant" teachers (Zhang, 2012). Many times, teachers are only adopting a computerized form (Freitas, 2004) of doing their business as usual (Blake, 2008); instead of a blackboard, they now use dull PowerPoint colored forms of the same lecture. In the words of Prensky (2001) himself, this is "very serious, because the single biggest problem facing education today is that our Digital Immigrant instructors, who speak an outdated language (that of the pre-digital age), are struggling to teach a population that speaks an entirely new language" (Prensky, 2001, p.2).

On this so-called "Digitization of Education", some authors such as Siemens (2006), Freitas (2004) or Veletsianos (2010) discuss concepts that not only brick-and-mortar universities hold the keys to acquire formal knowledge today. Open CourseWares from MIT (https://ocw.mit.edu/index.htm), Yale (http://oyc.yale.edu/courses) or UNL (http://www.unl.pt/ensino/e-learning/e-learning) and other institutions assess the fact that attending college is not solely to have content access anymore. Moreover, it is admitted that the changes brought to the pedagogic ethos of education (Garrison, 2011) is more than mere delivery of content via ICT. We are witnessing an era of reshaping of procedures, of a reconstruction of

knowledge sharing (Godwin-Jones, 2011); in fact, it is an overhaul of classroom routines (Stald et al, 2014).

For Anderson (2008), "the greatest affordance of the Web for education use is the profound and multifaceted increase in communication and interaction capability" (p. 54). This multifaceted communication transcends the teacher-student binomial relationship. The content has a whole new function of its own, creating connections to the learner without the monitoring aspect from the instructor or professor (Freitas, 2004). On Figure 2-6 below, we present Anderson's perspective to this redesigned relationship induced by the digitization of educational processes.

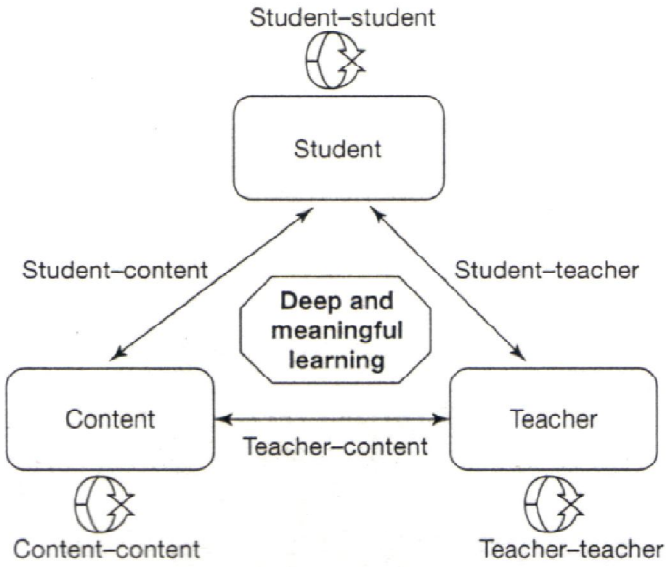


Figure 2-6: Modes of Interaction in Digital Education for Teacher – Student – Content. (Source: Anderson, 2008).

Creating a deep and meaningful learning (Gillespie et al., 2007), these relationships have axes of their own which means that teachers and students now establish a proper and individual observation of their roles in the process when interacting with the content. We are under the perspective that actions like this promote "mindfulness in learners" (Anderson, 2008, p. 55) and the knowledge society is all about developing the mind of the individual. This educational theory approached by Anderson (2008) is denominated Connectivism (Anderson, 2008; Downes, 2012;

Siemens, 2006) and we developed a short analysis over its concepts and main ideas in this study.

One of the major issues to be under assessment on this Connectivism (Downes, 2005) and digitization of education is the definition of what learning really means nowadays, resulting of a re-defined notion of knowledge and about paradigms being broken (Brown & Mbati, 2015). Is ICT really improving learning substantially or just representing another "vehicle that provides the processing capability and delivers the instruction to learners" (Anderson, 2008, p. 16)? For some authors, the perception is that the medium does influence learning (Anderson, 2008) and with the internet, pieces of information (Davies, 1999; Kwan et al., 2011; Oblinger, 2006) have to be aligned, selected and nurtured to result in some useful knowledge.

Historically, from Behaviorists like Skinner (1953) passing through Cognitivists such as Ausubel (1963) to Constructivists who were represented by the ideas of Jean Piaget; it seems that we are under the premises of a new theory entitled Connectivism (Anderson, 2008; Downes, 2005; Siemens, 2006). The main argument seen in the discourse of Siemens (2006) is that "we now need a theory for the digital age to guide the development of learning materials for the networked world" (Anderson, 2008, p.18). This theory would encompass the necessary pedagogical arrangements to be done by professors and students in dealing with the major transformations we see in the world created by the very imposition of ICT in most processes of modern life, including attending university. Higher education institutions as well as regular high schools are under pressure for adopting 'new' formats of classes where technology not only presents itself as a tool (Green & Hannon, 2007; Oblinger, Oblinger & Lippincott, 2005) for delivering content but also brings a redesign of actions on how knowledge should be acquired. Professors have to redefine their occupations, taking aside the main task of content disposal and assuming a position of coach, collaborator, or mentor.

Mentoring now is what teachers are supposed to be doing in class and also providing a nice atmosphere to supply content deficiencies of students via ICT. On this re-definition of roles, professors and students now sail together through an ocean of information (Anderson, 2003) on the web, grasping what makes sense and discarding the unnecessary information. The real challenge is how students will perceive what information is needed and, therefore, acquire them. For starters, learners have to

understand and process that information should be arranged in meaningful sequences and,

> due to the information explosion in the current age, learning is not under the control of the learner. Changing environments, innovations, changes in the discipline and in related disciplines all suggest that learners have to unlearn what they have learned in the past, and learn how to learn and evaluate new information. (Anderson, 2008, p. 19)

This unlearn-relearn process is the kernel of the issue on this doctoral research when Connectivism through tablets, smartphones and computers are all intertwined with many situations of life, in education and at work. As we established, learning in contemporary times goes beyond the memorization process and some authors understand learning as promoting higher standards of acquisition while accessing, analyzing, synthesizing and evaluating information available on a website or on a mobile application.

For Kolb (1984) and his Learning Style Inventory, learning experiences are formatted through a Perceiving Continuum and a Processing Continuum and create styles of learners that range from Diverging, Assimilating, Converging and Accommodating (Kolb, 1984). These styles are a result from cycles of experiencing, reflecting, thinking and acting. For Perceiving, the author understood a manner by which learners "sense and absorb the information around them" (Anderson, 2008, p. 26) going from a concrete experience to an abstract concept. In Processing, Kolb (1984) focused on how this information is absorbed through an active experiment to some reflection, resulted from an observation. The Figure 2-7 illustrates these ideas.

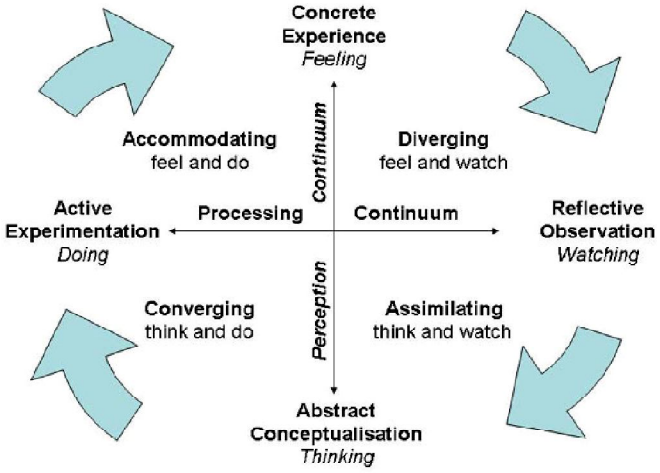


Figure 2-7: Learning Styles Inventory by Kolb (1984). (Source: simplepsychology.org)

As educational content is becoming accessed mostly via digitized information, Perceiving and Processing are the main aspects to be developed by higher education institutions lately. Perceiving demands a heterogeneous point of view (Kolb, 1984) that is developed through time and comprehends how some fact or information matters in a bigger context. Hirumi (2002) delineates that these "encounters" with information happen via interactions with human and/or non-human resources. As stated before, in our research we focus the attention to interactions with non-human resources – the SLA mobile applications themselves. This engagement between the learner and the subject studied is a process of "intellectually interacting with content to bring about changes in the learner's understanding, perspective or cognitive structures" (Hirumi, 2002, p. 144). That is exactly what we intended with our research: students interacting with apps to learn English in a cognitive self-regulated experience.

2.3 Mobile Learning: concepts, routes and the App Generation

We begin this section of the literature review agreeing with the academic quest for defining an appropriate theory for mobile learning or m-Learning (Abrantes, 2011;

Kukulska-Hulme, 2009; Traxler, 2013) that moves from the paradigm of mere differentiations between e-Learning and mobile learning. Sharples, Taylor and Vavoula (2010) clarify that m-Learning emerges "as the next generation of e-Learning", since both models share more than boundaries and characteristics but are different. The aim is a theorization process that covers the nuances and idiosyncrasies of this mobile format better. Since smartphones and tablets are establishing an unprecedented relationship with educational content, researchers have to investigate as many forms as they find it possible, especially designing experiments such as this study on Readiness (Pollara, 2011; Joseph, Corbeil & Valdes-Corbeil (2007) for m-Learning acceptance and adoption (Venkatesh et al., 2003) in higher education institutions.

However, the search for 'the one definition' of mobile learning do not seem to be a major concern to some reference authors like Traxler, Barcena & Laborda (2015) who observe that "the need to define mobile learning may, of course, seem sterile and pointless" (p.1234). To Kukulska-Hulme (2009), there is something beyond the mobility "in terms of spatial movement" as these connection experiences we develop nowadays with smartphones and tablets amplify the horizon of this concept. The author asserts that m-Learning experiences are more and more "weaving the interactions with mobile technology into the fabric of pedagogical interaction that develops around them" (Kukulska-Hulme, 2009, p. 159).

For Chen (2013), the sheer presence of smartphones has "changed foreign language instructional methods and learning strategies" (p.20) as it fosters the autonomy in developing linguistic skills on the learner: be it on oral skills, when students work with elements of listening and speaking, or when the app delivers solutions to improve written skills; focusing on textual expression or reading the language. When the objective is to define the best theory possible for adopting apps in learning processes, experimentation and diffusion have to be involved as they produce the most realistic or authentic results. It is some sort of an x-ray of the students at that moment, for that learning experience. As on this doctoral research, the experiment was designed to verify their readiness (Parasuraman & Colby, 2015; Pollara, 2011; Souza & Luce, 2005) to the acceptance and adoption of m-Learning (Venkatesh & Bala, 2008) and implementation of SLA apps into their 'digital routine'. The final outcome was based

on the adoption and rejection rates of participants, as well as their responses to the reasons of such attitudes.

On theoretical grounds, some definitions focus their approach on a learner-centered perspective whereas others shine a light to the gadget + software axis (Parasuraman & Colby, 2015). This dichotomy has been the center of most debates during these first years of mobile learning. More recent works have started to focus on the "social component" (Picciano, 2002) involved in learning with mobile technology. According to O'Malley et al (2003), "any sort of learning that happens when the learner is not at a fixed predetermined location, or learning that happens when offered by mobile technologies has to be defined as m-learning" (p.6).

The first studies of mobile learning in Europe initiated in the 1980s when early handheld devices such as the Microwriter and the "Psion handheld computer" were used in a few schools, and the latter was "mainly restricted to classroom use for the teaching of English" (Kukulska-Hulme, Sharples, Milrad, Arnedillo-Sanchéz and Vavoula, 2011, p. 153). Some years later, mid 1990s, the perspective on mobile learning was derived from experiences as observing the possibilities of Personal Digital Assistant (PDA) devices similar to HandLeR in learning experiences. The first characteristics observed were that mobile devices per se are portable, individual, unobtrusive and somehow easy to use (Kukulska-Hulme et al, 2011). The second generation of studies on m-Learning (Burston, 2015; Kukulska-Hume, 2009; Traxler, 2013) started in 2002 with the inaugural event of mLearn Conference verifying the MOBIlearn and some other projects from the previous year. In parallel to that, research journals from the Mobility academic field started discussing how "mobile learning continues to challenge the boundaries imposed by traditional classroom learning" (Kukulska-Hulme et al. , 2011, p. 152); and it is a major topic for research nowadays, as mobile learning has not yet transformed substantially practices and routines of classrooms (Daeid, 2008).

Through the initial days of m-Learning, the concepts and references adopted to analyze this new realm were "imported" from e-Learning experiences with desktop computers. Soon enough, the differences perceived by experts delineated the urgent necessity of more studies focusing on mobility, portability, ubiquity (Vieira et al., 2014) and its pedagogical aspects. Traxler (2013) establishes that m-Learning "enhance, extend and enrich the concept and activity of learning itself" (p. 4) and expresses other

interesting issues found in mobile learning: helping out-of-reach communities or eliminating geographical distances by the delivery of information to deeply rural areas. Or even when it establishes an authentic support to hearing impaired people to have learning opportunities; all aspects here deal with the potential range of the modality.

Although technologies often carry some form of (political) ideology embedded (Birdsall, 1996), this was not an issue to be included on the questions to the participants since our objectives here are solely pedagogical and linguistic. Enriching foreign language learning experiences (Kukulska-Hulme, 2005; Traxler, 2013) was the key factor when they incorporated the use of apps into SLA – there was no intention of promoting the learning of the English language for the sake of linguistic imperialism (Phillipson, 1997). Among the characteristics of mobile learning studies devoted to second language acquisition included in the literature review, we encountered examples covering students' learning development (with a pre-test and post-test procedure) as in Wang & Young (2014); Chen & Hsu (2008) and Valk, Rashid & Elder (2010), and all of them assuring there is no relevant increase to results and L2 acquisition maintained levels similar to pre-digital (Prensky, 2001) methodologies and procedures.

Other works investigated how students used their mobiles for language acquisition only outside formal settings of classrooms (Finardi & Porcino, 2014; Stockwell, 2010; Tonoian, 2014) focusing the main objectives of their study in perceptions of autonomy and mobility. A few of the studies displayed a difficulty of replicability of results as in Burston (2015) or Mackey & Gass (2012) where analyses soar over the feasibility, strengths and weaknesses of L2 learning experiences.

Before the current boom of mobile phones and their ubiquitous use, most ICT-included studies in the past demonstrated a tendency for educational tasks to be performed on PC's (Stockwell, 2010) however we have to highlight that cell phones and tablets evolved to a different dimension, especially after the arrival of Touch Screens (Koole, 2009; Kukulska-Hulme, 2009; Pellerin, 2014) that transformed the human-computer interaction catapulting smartphones (and tablets) into devices that are "more personal also in the sense that they are individually highly customizable and small enough to be always within reach" (Godwin-Jones, 2011, p. 8)

Amongst some of the other understandings generated from this literature review on mobile learning we can mention issues that hindered time spent on m-learning: a

considerable number of studies had participants expressing a concern related to the apps interface constraints – screens are too small (Bottentuit Junior, 2012; Chinnery, 2006; Kukulska-Hulme, 2010), the necessity of lots of scrolling (Ballard, 2007; Cheon, Crooks, Chen, & Song, 2011; Stockwell, 2010) or keyboards that are hard to type in (Bartholo, Amaral & Cagnin, 2009; Gikas & Grant, 2013; Stockwell, 2010; Zhang, 2012). In the research presented here some participants mentioned these issues and it was clear that 'learning thru an SLA app' may have been the first time they tried to acquire some foreign language through a mobile virtual learning environments (Dyson & Campello, 2003; Müller, 2013). Necessary to say, a great majority of the graduates involved in this research rarely had a second language learning experience on notebooks, PC's or mobiles; a question made to them by the researchers on the presentations and that had many negative answers. Their lack of knowledge (Ajzen, 2002) about the SLA apps available reveals the worth of an academic investigation on the diffusion of L2 mobile apps.

For Koole (2009), the FRAME Model (Framework for the Rational Analysis of Mobile Learning) brings into an academic perspective, the social aspects of learning in a close relationship with the personal aspects of the Learner; and also with the technical characteristics of the mobile device used by this very learner. FRAME takes into account "concepts similar to those as found in psychological theories such as Activity Theory (Kaptelinin and Nardi 2006) – especially pertaining to Vygotsky's (1978) work on mediation and the zone of proximal development" (Koole, 2009, p.26).

On the model, mobile learning experiences are symbolized by the consumption and creation of information, in our case linguistic information, produced through interactions with mobile devices as smartphones and tablets (Hirumi, 2002). The latest version of the FRAME Model (Koole, 2009) is represented by a Venn diagram that portrays intersections of three aspects: the Device Aspect, the Learner Aspect and the Social Aspect. These Aspects are intertwined in a symbiotic relationship and the "intersections where two circles overlap contain attributes that belong to both aspects" (Koole, 2009, p. 27). The Figure 2-8 below shows the diagram and we analyse it in the following lines.

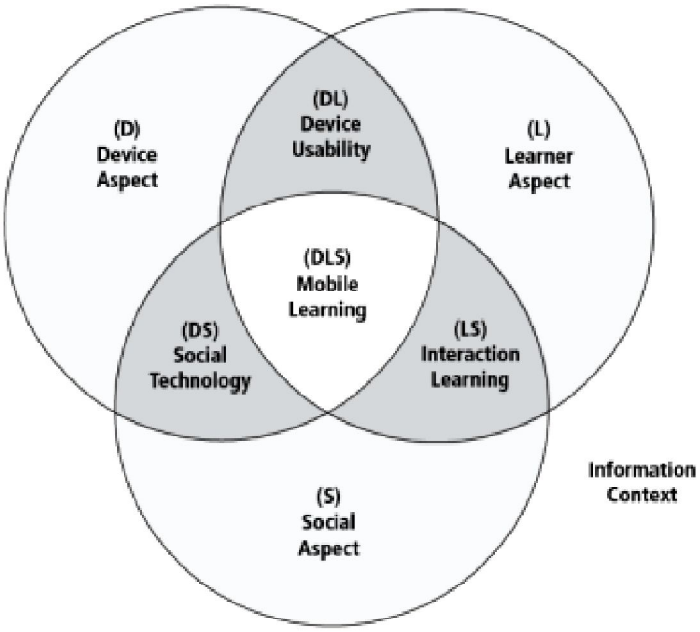


Figure 2-8: Framework for the Rational Analysis of Mobile learning - Frame Model.
(Source: Koole, 2009)

To infer over an analysis of the intersections, we take in device usability (DL) and social technology (DS) intersections and these are labeled as affordances of mobile ICTs (Brown & Mbati, 2015; Koole, 2009; Kurtz et al., 2015; Stockwell, 2010). On the SLA app panorama, they are affordances because they can provide learners with tools and social functions (Jarvis & Krashen, 2014) that certainly contribute to language acquisition. Interaction learning (LS) is an intersection that comprehends instructional and learning theories and emphasizes the social elements present in learning and being language one of the main tools for social communication, language learning apps have a lot to offer with these ideas. To represent this concept in more concrete terms for this investigation, we have the example of the app interface from Speak English Daily (Figures 2-9 and 2-10) where one can learn phrases in categories divided by sociolinguistic functions (Davies, 1999; Finardi & Porcino, 2014; McLaughlin, 1990) of the communication – Greetings, Arranging accommodations, Making Friends, Shopping, etc.

Figure 2-9 and Figure 2-10: Sociolinguistic functions and sentences at the Speak English Daily app. (Source: Speak English Daily® - 2017)

In the center of the diagram at the overlapping area (DLS), the three aspects imbricate in an "ideal mobile learning situation" (Koole, 2009, p. 27) which is many times a utopian paradigm hard to be achieved. Explaining it further, in many moments one or two of the aspects have more influence on the mobile learning result than the third one – and this linguistic product depends on a series of factors that affect L2 acquisition. In an attempt to comprehend the idea better, many authors as Godwin-Jones (2011), Koole (2009), Stockwell (2010) perceive physical characteristics like storage range, input/output capabilities, processor speed, expandability, screen size as part of the Device Aspects. In the Social Aspect, people must obey the rules to communicate effectively in their social interactions; creating situations for the acquisition of knowledge (Al-Fahad, 2009; Santaella, 2009) and maintaining cultural practices. In our opinion, the Learner Aspect derives from the learner-centered approach (Kukulska-Hulme, 2010; Sharples, 2000; Traxler, 2009) innate in the philosophy of m-Learning or even MALL (Mobile Assisted Language Learning) observing the conditions of "individual's cognitive abilities, memory, prior knowledge, emotions, and possible motivations" (Koole, 2009, p. 29).

There is no doubt that our focus is the acceptance and adoption of mobile learning however we cannot leave aside major learning theories which are immersed on our

ideas here. It is clear the presence of Connectivism (Anderson, 2008; Downes, 2012; Siemens, 2006) in the study and special attention is devoted to it in Chapter 3. It is also possible to see some of Ausubel (1963) and his meaningful learning theory intertwined on it. His Cognitive Theory understands learning as a combination of the knowledge someone already has in their cognitive structure (primary determiner) in conjunction with a high amount of exposition to the object/topic of interest through an action process. This addition results in some form of learning, as it was seen on this research via the acquisition of English language through the apps and their activities.

Other theoretical concepts we certainly see when acquiring Second Language through digital apps are from Bruner (1996) in his Constructivist theory and discovery learning. Tailored to the user's needs, learning happens in a form of 'personal discovery' through the navigation and execution of the activities proposed. This digital interaction with the apps happens in a non-linear way (Graham, 2012; Traxler, 2009) brings "greater multi-media richness than books but in smaller chunks governed by the heuristics of usability" (p. 8). It allows apprentices to identify personal needs from a menu of options; grammatical or socio-linguistic for instance, using the application as a linguistic discovery experience and "obtaining knowledge for oneself. Discovery involves constructing and testing hypotheses rather than simply reading or listening to teacher presentations" (Schunk, 2012, p. 266).

On our attempt on participants accepting and adopting mobile assisted language learning (MALL) into a graduate student digital routine, we bring MALL into the academic grounds. To the success of that idea, the fact that mobile device ownership by participants is indeed a giant ally on this incorporating of m-Learning inside higher education institutions, be it a second language or any other topic. The Bring Your Own Device – BYOD (Costa, 2013; Kobus, Rietveld, & Van Ommeren, 2013; Dahlstrom, Walker & Dziuban, 2013) trend supposedly helps the increase of use as students have smartphones and tablets on them almost 24/7.

Nevertheless, there are some issues to be dealt before MALL really goes into mainstream. For starters, we should investigate about the lack of willingness (Stockwell, 2010) by the end-users to try m-Learning, a situation which replicates the same adjustments teachers had to manage when with the introduction of CALL (Computer Assisted Language Learning) in Applied Linguistics some years ago. ICT skills were a

strong component of our equation here as the more e-competent and ready (Pollara, 2011) to experiment SLA apps the learner was; the more inclined he/she was to use them – so early adopters, early majority and late majority members (Rogers, 1983; Sahin, 2006) were more participant in this study sample. As previously mentioned, for some digital natives (Prensky, 2001) learning through computers, smartphones and tablets may be easier than learning via traditional ways.

An aspect to consider in m-Learning studies is that most of the functions designed for smartphones are not primarily devised for educational purposes, so what we have is an adjustment of Human-Computer Interface - HCI (Dix, Finlay, Abowd, & Beale, 2004) elements to fit educational contexts (Kukulska-Hulme, 2009). Other component that might impede smartphones and m-Learning to become major players in education is the "sense of freedom" (Sarker & Wells, 2003) brought by mobiles and the natural context of their usage. These can be deterrents to the development of educational purposes which require a more focused attitude and higher levels of concentration to be triumphant. Moreover, students will determine what format is more adequate to them but we, as educators and researchers involved in language acquisition, have to raise their awareness to these L2 possibilities and experiment with them.

On this quest for an appropriate theory of education for the mobile age, scholars have a consensus that m-Learning has to account for the ubiquitous presence of mobiles in our daily lives hence, mobile learning should embrace to the informality of apps and reformulate its analysis to reconsider "learning as a personal and situated activity mediated by technology" (Traxler, 2009, p. 5). Learning also has to be considered "a continual conversation with the external world and its artifacts, with oneself, and also with other learners and teachers" (Sharples, Taylor & Vavoula, 2010). That is exactly the core of our concept for learning on the development of this doctoral dissertation. The graduates using their (mobile) artifacts interacted with linguistic instructions on the SLA app or even with other learners. This social media trend can be found on Busuu (Figures 2-11 and 2-12) where the exercises done by the users are sent to and corrected by a native speaker in a social learning feature of the app (Wenger, 2010).

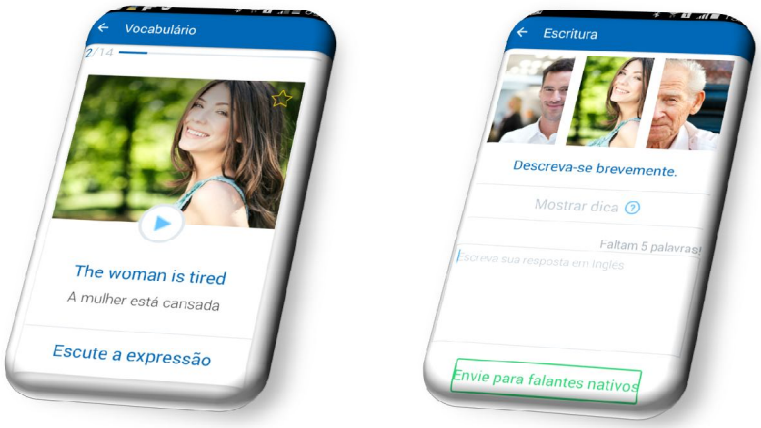


Figure 2-11 and Figure 2-12: App Busuu: activity correction by native speakers. (Source: Busuu® – 2015).

For now, this personalized involvement with a native speaker available at the app permits an interaction in real language difficult to reproduce in any textbook activity or Audiovisual method due to its unique intimacy character. As a matter of fact, it certainly resonates with this theoretical argument of Sharples (2010) and his associates.

> In order to understand the complexity of learning we need to analyse a distributed system in which people and technology interact to create and share meaning. But putting people on a par with computers and phones fails to take account of the unique learning needs and moral worth of each individual person. (Sharples, Taylor & Vavoula, 2010, p.10)

On this Chapter, we also analyse some aspects of the App Generation (Gardner & Davis, 2013), and generation defined at the Merriam-Webster dictionary as “a group of people born and living during the same time”, or the “average length of time between the birth of parents and the birth of children” (Merriam-Webster, 2016). This current generation is being defined by some specific characteristics including the massive use of digital and electronic components. As in Prensky (2001) and his ‘digital natives’ or Tapscott (2009) with the ‘Net Generation’; we are witnessing a debate of some sociological aspects that may not achieve consensus. As a matter of fact, definitions of generations are conceptualized over historical events like wars, economic hardship, political protests and cultural changes. For Kupperschmidt (2000), a generation is “an

identifiable group that shares birth years, age, location and significant life events at critical developmental stages".

American psychologist Howard Gardner (2013) states that we are at "app mentality" times and living in a "hyper digital era" (p.12). The author defines this generation of 20-year-olds as the App Generation, where a "carefully crafted online persona" (Gardner & Davis, 2013, p.5) is one of the new paradigms in social behavior, if not the main template to a concept of 'existence' for so many people around the world nowadays. In a controversial idea, the author divides this generation between app-dependent vs. app-enabled people (Gardner & Davis, 2013, p.45). Although we corroborate with the concept of apps and smartphones being used as a learning tool that promotes "cognitive, social and emotional capacities to broaden their understanding and enrich their productions" (Gardner & Davis, 2013, p.122); would the use of mobile applications for thousands of different purposes nowadays be the kernel, the main reason to name a generation that is reshaping itself every three of years, if so? To contradict me, Oblinger, Oblinger & Lippincott (2005, p.67) asserts that "the technologies available as a generation matures influence their behaviors, attitudes, and expectations. People internalize the technologies that shape information access and use, as well as the ways they communicate."

Hundreds of books have been written over machines and societal advancements and "whether we control the technologies or if the technologies control us" (Gardner & Davis, 2013). To the discussion on this research, the use of smartphones and tablets in Unit English classes by the authors changed most of the students' perception (Rahamat, Shah, Din & Aziz, 2011) of how to make use of dictionaries and thesaurus available in mobile applications. Even after this, we cannot state they learned the English language better only because of this alternative information delivery system – via an app.

After some time for a proper adaptation, it was noticed that students' use of such apps happened "anywhere, in special outside of class" (Kukulska-Hulme, 2009; Tonoian, 2014) during breaks, extra-class activities or even commuting and it was completely "learner-centered" (Anderson, 2008; Beatty, 2010; Zhang, 2012) since students focused on their own linguistic needs and vocabulary deficiencies. The majority of college graduates today are digital natives (Prensky, 2001) and consequently, this ubiquity of educational tools and strategies to be used through gadgets must be on the agenda of

pedagogical theorists (Müller, 2012; Valk, Rashid & Elder, 2010). When interactivity (Hoy, 2011; Marçal, Andrade e Rios, 2005) permeates classroom discussions and activities, it is what this generation longs for; yet according to Oblinger, Oblinger & Lippincott (2005, p.45), "whether it is with a computer, a professor, or a classmate. They want it; they crave it. Traditional lectures are not fulfilling the learning potential of typical students today."

Digital media (Stald, 2008; Warschauer & Healey, 1998) has left a few areas out of its reach; Education is not one of them, though. Today, universities, colleges and high schools are bombarded with new ideas and formats to implement ICT on their practices; this research study delivering another one, but results on studies done worldwide have been prone to show that a long way is still ahead. Gardner & Davis (2013) express their concern with the entrance of mobile applications and technologic procedures in pedagogical instances and as suggested that in the

> terms just introduced, we can see apps either as the latest shaping technology in the repertoire of the behavioral psychologist or educator, or as a technological lever for inducing the kind of exploration endorsed by the constructivist psychologist or educator. (Gardner & Davis, 2013, p.31)

These authors aim for a coherent use of the applications by educators and students, and coherent means involving depth in analysis, exploring all learning possibilities provided by a certain virtual learning environment – be it for 2nd language acquisition, Mathematics or Geography. Once again, the quest seems to be achieving meaningful transformation to create autonomous and pro-active learners – the app-enabled ones (Gardner & Davis, 2013). This enablement certainly involves students thinking by themselves, developing their own structures of knowledge. To bring criticism to some facts, Gardner & Davis (2013) assess that "digital media encourage superficial thinking thwarting the sustained reading and reflection enabled by the Gutenberg era" (p.34); reinforcing his dichotomy about app-dependent versus app-enabled people. The enabled ones would be those end-users who master the applications viewing them as a scaffold (Bruner, 1996) to knowledge acquisition, but always in charge of the artifact. Yet according to the Gardner and Davies (2013), dependent users would be those who are restrained by the boundaries of the virtual

learning environments (Dyson & Campello, 2003) and cannot develop independence while acting on or through it.

If we need some other concept to be taken into account when implementing apps in educational practices, it is Relevance (Koole, 2009); the key issue on the design, use and analysis of applications through recent times. Experts estimate that students around us are certainly "searching for the relevant app. The app exists, the teacher certainly knows it, and fair play entails providing for the students, as efficiently and straightforwardly as possible" (Gardner & Davis, 2013). Relevance, understood in this empirical study as linguistic relevance, means using technology and SLA mobile apps with a pedagogical implications (Golonka, Bowles, Frank, Richardson & Freynik, 2014) to be covered, be it inside or outside class, and not "for the sake of using technology". (Oblinger, Oblinger & Lippincott, 2005, p. 4).

Social and especially technological advancements happen in such a speed that the term 'Generation' (Kupperschmidt, 2000) as in "App Generation" might not fit so adequately. A generation covers 30 years and this in technology terms sounds like a millennium. Members of the app generation (Gardner & Davis, 2013) do not distinguish online from offline. They are all mixed on this frenetic obsession with "doing" more than one thing at a time; the multi-task contemporaneous way of life put to an extreme. Gardner & Davis (2013), as illustration, take a daily activity as walking the dog and describe the scene today as people with a dog attached to the hand but mostly looking at a cell phone.

Sociological changes that come as a reflex of ICT entering our lives abound in literature however personal experiences and a local perspective rule these changes; in Africa, mobile apps and ICT are changing lives in a very different way (Traxler, 2013) to what is happening in Cascais or in Ipanema. Among these changes that occur in a social plateau, the author exemplifies an aspect where technology may be considered as a curse. Personal failures once witnessed by just a few of your friends are now posted online and present an aspect of eternity – a "permanent digital footprint" (Gardner & Davis, 2013, p.78), and that can bring you some social or professional embarrassment later.

One more issue to ponder attentively is the 'instantaneity' of this generation; something that educational systems will have to adapt themselves to. This is a

generation of snapshots and video sharing on social medias, of SMS messages coded with the most diverse acronyms to make it short and quick to send. In fact, millennials many times understand life as a "culture of speed and currency, with a preference to post or react instantaneously" (Weller, 2001, p. 67). Hence, they demand this instantaneity from every aspect of life including their education. When mobile learning proposes a methodology that incorporates the easy usability, ubiquity and portability of the tool into a great deal of autonomy and self-pace by the learner, the formula for success is a question of time. Scholars and educational institutions will gradually have to incorporate smartphones as they have done with previous technologies such as TVs or PowerPoint. The huge difference in m-Learning comes from the pedagogical time and space paradigms (Bauman, 2001; Chen & Chung, 2008; Eduardo, Oliveira & Lima, 2015) that are shattered for good.

As mentioned, app generation members often value things based on their immediacy (Chinnery, 2006); be it content, products, services and now, different demands to overcome instructional slow methods. The skyrocketing popularity of communication apps such as WhatsApp or Messenger (Facebook) mostly based on their instantaneity (Kwan, McNaught, Tsang, Wang, & Li, 2011) or for their readiness (Parasuraman & Colby, 2015; Pollara, 2011), reliability and response (Abu-Al-Aish & Love, 2013) is transforming perceptions of things in our daily lives. Fortunately or not, education has to adapt itself.

When it comes to the analysis of the plurality of ICT and mobile gadgets inside schools, Gardner and Davis (2013) call the attention to the lack of own ideas demonstrated by the students today, pointing that they currently have reported being more "comfortable engaging with the existing ones" (Gardner & Davis, 2013, p.138). We are not questioning Gardner's world acclaimed theories but only helping the debate with some personal doubts. How does this 'lack of own ideas' impact curriculum practices and educational purposes inside our classrooms? How was this 'lack' quantified or measured? As pointed by Oblinger, Oblinger & Lippincott (2005), our current graduates are "the beneficiaries of decades of technological development that preceded them; at another level, as students they use these technologies in new ways, and in so doing are redefining the landscape in higher education and perhaps beyond" (Oblinger, Oblinger & Lippincott, 2005, p.68).

Individuals have always been responsible for the creation of new ideas when they observed the world around them; today, most of them is looking at luminous screens all the time. As a matter of fact, we have to move away from some technological determinism (Castells, 2005; Lucena; 2016; Stald et al., 2014) or from an ICT-for-all panacea (Weller, 2011) and see where gadgets should fit in daily (educational) practices and when they should be put down. Undeniably, the deluge of information we have nowadays, 24/7, reshapes everything for the 'app generation' who is still defining its boundaries and learning how to deal with so much knowledge available. Acting-wise, no technology exists in isolation but it occurs due to a fundamental interference of humans. So, taking the school practice to real life, "learning through social interaction is important. Feedback from the professor is vital, and working in groups is the norm" (Oblinger, Oblinger & Lippincott, 2005, p. 44).

Human life stages and cycles certainly are under some form of reexamination due to ICT and consequently, education will present a reflex of those changes – the major question is what capacity? As we saw in Gardner & Davis' writings, "lifelong and one-size-fits-all curricula does not work any longer" (p.174), individualities matter however it is not seen some transformation in the form schooling is still organized; in special if we analyse aspects focusing on the major issue brought by Anderson (2008), Siemens (2006) and many other theorists – is the digitization of education something evolutionary? Or once again, apps only present an updated digitalized version of traditional classes and pedagogical behaviors always practiced. The aim should be a new format of knowledge acquisition, a redefined perspective on information gathering through a whimsical experience (Robinson, 2013) and here, we might understand 'whimsical' etymologically as capricious, humorous and with some creativity inside.

What we are proposing to the app generation is to undertake mobile applications in education through a pattern of critical thinking (Kuhn, 2011), grasping the real meaning of expressing yourself, and making logical connections to the subject studied – this case, the English language. It is about the creation of a knowledge-gathering attitude that precipitates and promotes real learning. We do not have all the keys to master this "different forms or formulations of knowledge" (Gardner & Davis, 2013, p.181) but being submitted to this cognitivist learning based on initiative, really dictates app-learning.

As mentioned, the apps selected for this research are five and were chosen due to the number of downloads they present on Apple and Android online stores. These statistics come from PC magazine, appbrain.com, appannie.com, sensortower.com and from application developers and they are from August 2016. By then, Babbel had 50 million downloads, British Council accounted for 10 millions, Busuu had achieved 60 million people installing the app, Duolingo reached the pinnacle of 90 million downloads and Speak English Daily was in a different category with less than 1 million people installing it worldwide.

This MALL (mobile-assisted-language-learning) in tablets and smartphones has become the post-modern paradigm in SLA instruction (Anderson, 2008; Campos, 2008; Moura, 2011; Oblinger, Oblinger & Lippincott, 2005) today; because the "school" is now literally inside our pockets and this fact has catapulted the accessibility to language knowledge (Krashen, 1981; Massard & Mehier, 2009) to an uncharted pattern.

2.4 The Diffusion and Adoption of Innovations in Education

As this research work was demonstrated in face-to-face classroom presentations and collected data via questionnaires at both universities, it became clear to the author that our task was first the diffusion (Rogers, 1983; Sahin, 2006) of the apps through UNL/UNIT graduates who, during a period of two to three months, provided data concerning their readiness (Parasuraman & Colby, 2015; Pollara, 2011) and their use of the applications per se. Through the questionnaires we gathered valuable information concerning their perceptions about the acceptance and adoption of some (pedagogical) innovation they were facing. We collected data from the learning process associated to these virtual learning environments (VLEs), their readiness to use it as a learning tool and the possibilities of linguistic progress they perceived (see Annex).

When 'diffusion' is involved on technological processes, it is mandatory to understand and go through the pioneering ideas of Innovation Diffusion Theory (IDT), a concept schematized by Everett Rogers (1983). Addressing the quest of Innovativeness in Society, this son of an Iowan farmer defined it as a "process by which innovation is communicated through certain channels over time among the members of a social

system" (Rogers, 1983, p. 5). Back to this study, this is not the first time an electronic innovation is adopted for educational purposes; nevertheless, taking into consideration the singular concept here – the volitional and autonomous use of mobile applications through self-regulated strategies for second language acquisition in higher education – we believe Rogers' concepts do belong here.

Observing that researches available were more oriented toward adoption than on implementation, Rogers (1983) established that diffusing an innovation is a way of communicating some new idea that would make people adopt it and move beyond past methods. Uncertainty is part of this experience for the adopter as innovations generally break paradigms and take time to be completely understood; hence, this 'newness' sensation has to be translated as an enjoyable experience for the user otherwise it raises the probability "of rejection or discontinuance" (Rogers, 1983, p. 92). As Rogers, Singal and Quinlan (2006) convey the meaning on this excerpt,

> communication messages of study are perceived as new by the individual receivers. This novelty necessarily means that an individual experiences a high degree of uncertainty in seeking information about, and deciding to adopt and incorporate an innovation. In the sense of the newness of the message content, the diffusion of innovations is unlike any other communication study except the diffusion of news. (Rogers, Singal & Quinlan, 2006, p. 4)

The persuasion process (Rogers, 1983) to influence an adopter demands perceptions of a positive experience or 'advantages'; and these were conceptualized as "attributes" by Everett Rogers in 1983. Relative Advantage, Compatibility, Complexity, Trialability and Observability were the attributes categorized by him through the study of several experiments of innovation implementation in the last century and we used these attributes to our formulated adaption of the theory (UTAUT+M). Relative Advantage refers to a perception the end-user has that the "newness" on innovations will promote some economical, professional or "social prestige" (Rogers, 1983) while aggregating convenience and satisfaction. In another attribute, Compatibility verifies whether the values and beliefs of the adopter match the ones promoted by the innovation itself. Complexity classifies the degree of difficulty found to the execution and comprehension of an innovation; in our case here, complexity is understood as the

pedagogical use and inevitable mishaps that may happen when participants tried for the first times apps such as Babbel or British Council.

Trialability is the 'hands-on' process where the utilization of an innovation is put to a test by potential users, and possibly the most important attitude in adoption. Troubleshooting, phase changes, perception of the human-computer interface (Bastien & Scapin, 2003) in hardware/software principles and the comprehension of procedures are all intertwined into this adoption or rejection decision by the future adopter. Finally, in the words of the pioneer himself, Observability "is the degree to which the results of an innovation are visible to others" (Rogers, 1983, p. 232). For Straub (2009), Observability moves social systems to a situation of limit that "an innovation becomes so pervasive in a culture that even those who would not normally adopt consider adoption of an innovation." (Straub, 2009, p. 631)

Rogers (1983), pointed out to the excessive attention given by researchers to the consequences of innovation and not enough focus in researching diffusion processes per se. We had this under perspective on this study and we cannot research over diffusion of innovations if not verifying its effects in social structures (Rogers, 1983), values and beliefs. This doctoral dissertation dealt with the acceptance and adoption of SLA apps in the 'digital agenda' of graduate students who have their own routine of mobile interactions and we aimed to affect and, somehow, alter that. Our objective was to create a high Rate of Adoption (Rogers, 1983) of the second language acquisition apps through UNL and UNIT students. Nevertheless, this adoption of SLA apps is a volitional act (Ferreira et al., 2012; Pintrich, 2004; Zimmerman, 2008) which might be affected by the people around the future adopter; these individuals have been named by Rogers (1983) as "change agents" or "opinion leaders", and they represent an

> opinion leadership, the degree to which an individual is able informally to influence other individuals' attitudes or overt behavior in a desired way with relative frequency. Opinion leaders are individuals who lead in influencing others' opinions about innovations. (Rogers, 1983, p. 271)

As every technological innovation, the pace of adoption takes a length of time that varies in relation to the adopter's attitude. In an attempt to define these elements in different categories, Rogers (1983) in his Adopter Categorization on the Basis of

Innovativeness labeled them as Innovators (2.5%), Early Adopters (13.5%) Early Majority (34%), Late Majority (34%) and Laggards (16 %). The graph for this can be seen on Figure 2-13 below.

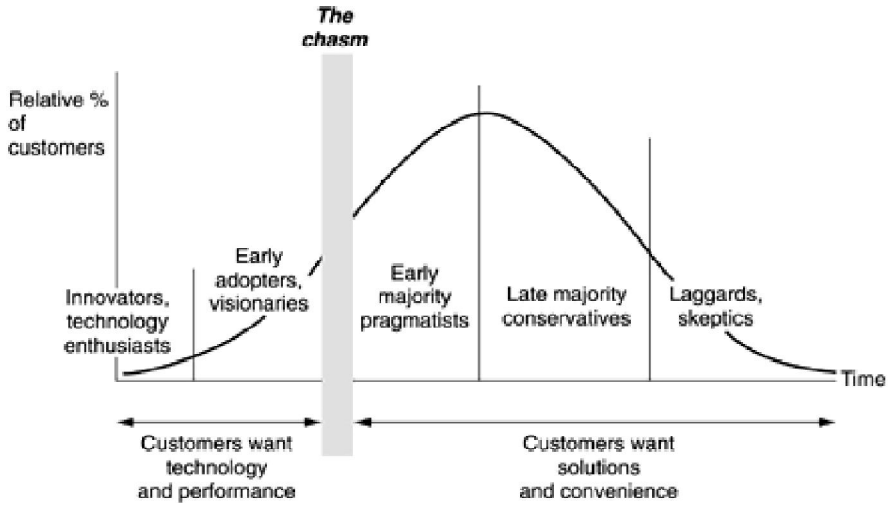


Figure 2-13: Adopter Categorization on the Basis of Innovativeness. (Source: Rogers, 1983)

Understanding these elements, Innovators are driven by 'venturesomeness' (Rogers, 1983) and anxious to discover the latest gadget and its use as it brings fulfillment and entitles himself/herself to a personal enthusiasm hard to explain to a Laggard. They tolerate setbacks and gladly "cope with a high degree of uncertainty about an innovation" (Rogers, 1983, p. 134). Laggards, on the other scope of the index, are traditionalists and not very fond of changes and rarely possess a strong social network. They adopt an innovation the last and have high degree of "disenchantment discontinuance" (Rogers, 1983; York & Turcotte, 2015).

Early Adopters are opinion makers but without the aura that Innovators carry; these are people who are "the embodiment of successful and discrete use of new ideas" (Rogers, 1983, p. 249); and they act before the Chasm – a gap area innovations crossover when they go mainstream. Early Adopters somehow establish how long it takes for this crossing; once they take less time from Rate of Awareness Knowledge (when an adopter understands how an innovation works) to Rate of Adoption.

Early Majority and Late Majority (Rogers, 1983) members are the biggest chunk of the population where answers and feedback on innovations have more volume and attention. Early Majority members correspond to a very important part of diffusion as they take the bell curve to its peak and generally "have higher socioeconomic status, have broad access to communication methods, have higher upward mobility within their social culture, are more likely to be literate" (Straub, 2009, p. 631). In a few words, they bring technology trends to mainstream. The next group is Late Majority, composed by people who are the skeptical ones and submit themselves to technology innovations mostly due to "an economic necessity and the answer to increasing network pressures. Innovations are approached with a skeptical and cautious air, and the late majority do not adopt until most others in their social system have done so" (Rogers, 1983, p. 249). They complement the task of Diffusion of Innovations taking it to the only category whose members are even more unenthusiastic to changes – the Laggards.

Diffusion does not only happen through communication channels as mass media which includes TV, radio, printed and internet publications but also via interpersonal channels; face-to-face communication that possibly creates stronger chances of "forming and changing attitudes towards the new idea, and thus in influencing the decision to adopt or reject a new idea" (Rogers, 1983, p. 198).

More attention should be paid to a couple of issues on the research about Innovation Diffusion Theory and its consequences: the excessive amount of pro-innovation bias studies which generally conducts the readers to adopt an innovation; and the lack of researches covering Slow Diffusion, Rejection and Discontinuance – these ones generally bring about failures and inconsistencies on the products or ideas and are not well seen by the market. On his classical book "Diffusion of Innovations", the author clarifies that

> we know much more about the diffusion of rapidly diffusing innovations than about the diffusion of slowly diffusing innovations, about adoption than about rejection, and about continued use than about discontinuance... the problem is that the proinnovation bias is limiting in an intellectual sense; we know too much about innovation successes, and not enough about innovation failures. (Rogers, 1983, p. 94)

With those concepts, we collected and analyzed data taking into account these issues as well. We observed the Rate of Adoption and Rejection (Rogers, 1983) of the indicated SLA apps by UNIT/UNL partakers considering and starting from their linguistic knowledge and needs, their digital literacy (Finardi & Porcino, 2014) background and technology readiness (Parasuraman & Colby, 2015; Pollara, 2011) as it was demonstrated by the responses on the first three questionnaires. Caplan and Nelson (1973) remarked that researchers of diffusion of innovations must avoid the Blame speech holding "an individual responsible for his or her problems, rather than the system of which the individual is a part" (Rogers, 1983, p. 103).

As the adoption of an innovation is a decision process where an individual assess the possibility of adding something new to his/her routine, there is a sequence of stages mostly defined by steps of approximation. So an Innovation-Decision process (Rogers, 1983) starts with a cognitive exposition to the gains and functions of the very innovation and it is called Knowledge stage. After this, an affection developed and derived from a positive or negative opinion constitutes the Persuasion stage. The Decision stage is, obviously, the choice of adopting or rejecting and rejection may be active – when there is a trial of the innovation or passive; when the individual not even tries the innovation, rejecting it as a whole (Rogers, 1983; Sahin, 2006).

The final two stages of the Innovation-Decision process are Implementation and Confirmation. The change of behavior of an individual during the Implementation stage seems to be the major component here as adoption is implemented in a volitional control of his/her practices. The final stage, Confirmation, is a result of a successful Adoption and it has on information reinforcements a strong characteristic. As one of the main objectives of this research is the acceptance and adoption of apps by English graduate students, these principles and concepts involving it had data collected and analyzed in Chapter 6.

2.5 Bologna Process, English language and Mobile learning in Portugal

Understanding the previous concepts of the knowledge society (Hargreaves, 2003; Siemens, 2006) and the internationalization of education designed for a national reality, we have to take into account the major changes the Bologna Process (1999) brought to Portuguese universities and its aftermaths where an autonomous, quality-based, scientific and independent knowledge (Ceia, 2013) must be developed as a mission. Looking at the international perspective of this dynamic educational agreement, it is an undeniable fact that European societies are knowledge-based and as a result "higher education, research and innovation play a crucial role in supporting social cohesion, economic growth and global competitiveness" (Prisacariu, 2015, p.122).

Bologna Process started in 1999 and it was determined to harmonize an "outdated and harmful" (EHEA, 2009) segmentation in European higher education. Signed by 30 countries in the beginning, it has today the participation of 50 nations strengthening "the competitiveness and attractiveness" (EHEA, 2009) of European institutions as well as promoting students mobility to its members (Ceia, 2008). With the process, major changes occurred in European undergraduation and postgraduation degree structures which adopted a three-cycle system in universities and developed special attention to learning outcomes. Biannual meetings have promoted exchange on experiences for improvements on this unification and at each reunion a new idea was included in the Communiqués. In 2001, participants in Prague implemented to the legislation structure of Bologna, the concept of lifelong learning (Jarvis, 2008; Sharples, 2000) whereas the expansion of objectives was a determinant result of the meetings in Berlin, 2003. In Bergen (2005), the main force behind the talks was the enhancement of Doctoral Programs and the third cycle.

In 2007, the London Communiqué enlarged the number of members to 46 countries and the main issue in discussion was mobility and social dimension as much as some introductory talks on the questions of employability; what seemed to predict the major economic crisis we faced the next year, with markets melting in 2008. The main working areas of the subsequent meeting (Leuven – 2009) brought 'student-centered learning' as much as the 'teaching mission' to the front of the discussions,

however, the conclusions were that more attitudes and procedures were necessary for a real implementation of the Bologna Process as initially planned. Celebrating ten years of the Process, the Budapest-Vienna Ministerial Conference (2010) aimed at the reinforcement of the original plans affected by the financial earthquake two years before and it ended re-establishing the priorities for the next decade. Romanians received the country members in Bucharest in 2012, where the necessity of more global mobility and quality enhancement was the tone to higher education institutions on the European continent. In 2014, in Rome, conference members asserted they need a renewed 'sense of direction' for the future.

English is the official language in most of these meetings, as well as the idiom of communication to the Bologna Process members; fitting the objectives and purposes of this research to Bologna stated goals (Ceia, 2003; Martins, 2012). Among these goals there is the dissemination of alternative forms of learning and teaching the language in universities and colleges in Portugal – now potentially augmented with the help of smartphones and tablets. Living in an era of mobile gadgets, we cannot take for granted the importance of using them as a learning tool. The necessity of Portuguese and Europeans to know the English language is based on having better chances at the work market or in academic mobility. On our literature analysis, we came across two relevant perspectives on the question of the employability issue as a result of Bologna inside universities. Ceia (2008) asserts the lack of an overall preparation to provide a full-time professional in many graduate courses. In his words,

> falar de empregabilidade no contexto de Bolonha apenas pode significar: preparação ou formação inicial para uma profissão, excluindo a exigência de um perfil completo para o exercício dessa profissão. Na prática, um curso de 1º ciclo (bacharelato ou licenciatura) pode dar acesso a um emprego, mas não qualifica totalmente para o exercício pleno de uma profissão. (Ceia, 2008, p. 2)

Martins (2012) discusses the web 2.0 possibilities for learning English in an improvement perspective for a "mercado de trabalho europeu caraterizado pela mobilidade, o desenvolvimento de competências em línguas estrangeiras assume uma importância crescente no que diz respeito à empregabilidade" (p. 15). Acting as a catalyst to long time needed reforms in Portuguese syllabi and institutions, Bologna

Process goals attended the necessity of a continental perspective for the upcoming higher education executed in Portugal. While not putting aside some local and fundamental aspects to maintain a "Portuguese flavor" to the learning applied around the country, it is observed through local universities the importance of knowing the 'lingua franca' in Europe as most scientific advancements, academic publications and symposiums happen in English.

Yet on the analysis of the implementation of this process in Portugal, Veiga and Amaral (2009) concluded there is a lengthy affair caused by the delay to a better framework and that the implementation perceived in Portuguese universities is more "in form rather than in substance" (Veiga & Amaral, 2009, p.57). The criticized binary system (Polytechniques and Universities) is still in place with minor improvements but the workload in bureaucracy seems to be the burden teachers want to put down as, in fact; they are still adjusting themselves to changed curricula and new study programs (Ramos & Espadeiro, 2014; Slattery, 2006).

Although Bologna Follow-up Group (2007) takes Portugal for a positive bias classifying the country as "having very good performance on the implementation of the European Qualifications Framework" (Veiga & Amaral, 2009, p. 59), the superficial allocation of credits and the deficit in teacher/student ratio are still thwarting a better job by Portuguese academia that shows itself in a state of readiness but cannot brag about a 'mission accomplished' yet. These authors do not clarify on details the limitations that non-native English speakers have with the language as lingua franca of the European Union but institutions analyzing this topic in particular have perceived there is a gap to fulfill.

Needless to say, we are aware of the threat caused by the UK language or Anglicism in demise of local and not-so-spoken languages. Phillipson (2008) alerts that 'internationalization' sometimes means 'English-medium higher education" (p. 16). On this train of thought, we do not intend to make a thorough analysis about the political implications and capitalist bias of the Bologna process itself, visibly destined to fulfill jobs in a business market of multinational enterprises. Our perception on this investigative quest has been over the curricular adjustments as well as pedagogical and linguistic consequences of a unification process that is in progress for the last eighteen years.

As scientific and social development are solidly erecting their basis over 'the intellect', and the results of academic research are mostly published in English; the relevance of achieving linguistic competence in the idiom for Brazilian and Portuguese university graduates cannot be left unchecked. For the main studies about m-Learning in Portugal and Brazil to this literature research, we have selected relevant works at Repositório Científico de Acesso Aberto de Portugal, Scielo/Brasil, Web of Knowledge and Google Scholar; and the topic was language acquisition or foreign languages due to the variety of themes involved on the subject of m-Learning nowadays. One of the pioneer works on the topic of mobile learning (aprendizagem com dispositivos móveis) is from Adelina Moura (2001) and it is entitled "Jogos eletrónicos para aprendizagem curricular em língua materna e estrangeira"[1] in which the author details some experiences in language learning focused on French vocabulary and grammar, exploring potential benefits on the adequate use of mobile devices for SLA. Moura (2011) is one of the most prolific authors on the topic of m-Learning for language acquisition in Portugal certifying her work through a doctoral dissertation at Universidade do Minho by the title "Apropriação do telemóvel como ferramenta de mediação em mobile learning: estudos de caso em contexto educativo"[2]; in which it is illustrated some experiences in Portugal that involved French language acquisition. For the author, m-Learning reveals

> um fenômeno que se desenvolveu, há pouco mais de uma década, com a evolução das tecnologias móveis e que tenta trazer uma abordagem complementar à pedagogia tradicional. Por se tratar de uma temática emergente, é necessária uma abordagem holística, para englobar diferentes temas do m-Learning e desenvolver novos tipos de actividades de aprendizagem com tecnologias móveis. (Moura, 2011, p. 486)

Adelina Moura has been a scientific partner of Ana Amélia Carvalho (Universidade de Coimbra) who is also a prominent author on the issue of mobile learning in Portuguese institutions. Authoring more than ten books on the subject, her production focuses on collaborative learning, multimedia in education, and more recently on mobile learning interactive activities with games. Her most cited paper on Google

[1] Authors'note: "Electronic games to curricular learning in mother and foreign language."
[2] Authors' note:"Cell phone appropriation as a tool for mediating mobile learning: case studies in educational context."

Scholar is “Rentabilizar a Internet no Ensino Básico e Secundário: dos recursos e ferramentas online aos LMS” with more than 140 citations as for July 2016. In it, the author details the need for the attention of teachers and students to the development of technological tools such as blogs, wikis, conceptual maps, and podcasts that “despertam o interesse dos alunos e que os motivam para aprender porque também vão publicar online e vão receber os comentários dos colegas, do professor e, possivelmente, de outros cibernautas” (Carvalho, 2007, p. 35).

Consideration of the underlying factors in other studies, they all seem to indicate the importance of students’ autonomy to the construction of personal “layers of interpretation” (Freitas, 2004; Moura, 2014; Weller, 2011). Those layers solidify an individual knowledge that attends personal requirements. Moreover, on this knowledge foundation, the student that gets “activamente envolvido na construção do seu próprio conhecimento desenvolve um processo muito mais enriquecedor dessa aprendizagem” (Freitas, 2004, p. 37).

Although different authors have put different emphases into their description of what mobile learning or m-Learning represents, they agree that some limitations are consensual. The mobile phone interface seems to be the major issue selected as a limitation especially in relation to screen size (Bottentuit Jr, 2012; Ferreira et al., 2012; Maniar, Bennett & Gal, 2007) and keyboard usage (Moura, 2011; Zhang, 2012). Memory capacity (Kurtz et al., 2015; Lyster, Saito & Sato, 2013) also comes up as a hindering factor to most students involved in experiments.

2.6 Brazilian critical mass and the contribution from Sergipe

Concerning the Brazilian reality of mobile learning inside classrooms at universities and high schools, we must start this subchapter paying due tribute to the pioneers of the practice in a country where basic elementary needs for education are not completely provided yet, especially in the public arena. From financial deficits, due to corruption (Caldas, Costa & Pagliarussi, 2016) through the lack of realistic guidelines or even brawn power to impede classroom violence (Gonçalves & Sposito, 2002); Brazil still needs to overcome several structural deficiencies and provides to its citizens a

public educational system that matches its 7th position in global economy (International Monetary Fund, 2016). Nevertheless, state-of-the-art studies and experiences have been developed in institutions dictating the path to the national academy which include educational projects and studies with international recognition. André Lemos, one of Brazil's most respected names in the area, alerts wisely "falar de tecnologias móveis, mídias móveis, espaço urbano e mobilidade no Brasil exige uma visão aguçada e atenta aos diversos paradoxos desse país" (Josgrilberg & Lemos, 2009, p. 8).

Historically, the country started developing this format of education where teachers and students were in different geographical locations around 1920's with the creation of Rádio Sociedade in Rio de Janeiro by Roquette Pinto (Vilaça, 2010). This radio station basically intended to diffuse "educação e cultura a todos os povos, estreitando o liame ciência, tecnologia e informação" (Jorge, 2009). Another exponent worth of mentioning was Instituto Universal Brasileiro (Vilaça, 2010), the second great achievement in distance education in Brazil that worked from 1941 to around 1980's developing initiatives with technical courses delivered via air and surface mail (Vilaça, 2010). Projeto Minerva was the next meaningful enterprise in Brazilian distance education with programs via radio. It started in 1970's, during the military dictatorship and the main objective was educating adults in far away destinations of the Brazilian territory such as Amazon and Pantanal.

Criticism to the project came exactly from its one-size-fits-all programming and the fact that people did not listen to the radio as an educational tool (Alonso, 1996). The Minerva experience never took into consideration the profound differences in regions that are within Brazil as one country and it only survived due to low cost of production and mandatory broadcasting in all national radios. Agreeing to the principles of Traxler (2009) who do not consider mobile learning a question of movement; but as an instructional method where students are not physically in front of a teacher and therefore content has to move to the learner's direction; we have to consider that the learning performed via surface mail as the 1st generation of m-Learning in Brazil; with lessons being broadcasted via radio as the second one. Internet and online experiences on a desktop literally made the third generation of learning moving towards the student. Now, with smartphones and tablets in many classrooms, Brazilian graduates

are facing the fourth cycle but with an unprecedented characteristic to the movement of the content – it follows you, it is on you, in your pockets or backpacks. This ubiquity, mobility and flexibility (Moura & Carvalho, 2011; Santaella, 2009; Sha et al., 2012; Traxler, Barcena & Laborda, 2015) are reshaping the procedures for the processing of knowledge (Siemens, 2006) as individuals today publish and exchange knowledge online and "possibilita o acesso no momento da necessidade e transforma-se noutro meio de transferência de conhecimento" (Moura, 2011, p.80). Not only brick-and-mortar schools and universities control that anymore. Coursera, edX, MiriadaX, open coursewares of prestigious institutions are now on apps and that is real change.

Before we check some of the studies produced by Brazilian institutions and authors, we may clarify that Brazilian Ministry of Education (http://portal.mec.gov.br) has some projects that involve technology in education such as Universidade Aberta do Brasil, ProInfo, ParFor, My English Online however most of them is developed for e-Learning experiences on PC's and notebooks and educational platforms focused only on m-Learning are still not available.

One of the first studies concerning mobile learning in Brazil is Pelissoli and Loyola (2004) where the authors discussed scenarios for the development and execution of m-Learning through text messages and podcasts with "pequenas gravações com as explicações do professor sobre um determinado conteúdo, onde os instrutores abordam os assunto através de uma estrutura de começo, meio e fim bem demarcados" (Pelissoli and Loyola, 2004).

Podcasts were a huge improvement to second language acquisition experiences (Campos, 2008; Martins, 2015) with millions of links containing excerpts of oral language from native speakers. One of the authors of this study has developed a Masters' degree dissertation on the topic at Universidade Federal de Sergipe in 2008. As for m-Learning pioneering study developed in Brazil we had Meirelles, Tarouco and Alves (2004) that observed how different cognitive styles of students adapted to the possible functional characteristics of mobile phones available thirteen years ago. According to them,

> muitos esforços serão necessários para possibilitar que objetos de aprendizagem venham atender os requisitos impostos pelos diferentes estilos

> cognitivos, respeitando as características funcionais dos dispositivos portáteis. Neste sentido, o mapeamento dos parâmetros operacionais dos PDAs, poderá apoiar a construção de objetos de aprendizagem diversificados. (Meirelles, Tarouco and Alves, 2004, p. 6)

Cognitive styles (Meirelles, Tarouco & Alves, 2004; Sampson et al., 2013; Zhang, 2012) and multiple intelligences (Gardner, 1987; Siemens, 2006) are part of the challenges to app designers due to their multiplicity and that becomes really complicated via the HCI of an app (Bastien & Scapin, 2003) whose range of variables is somewhat restricted. Among the first discussions on m-Learning in Brazilian academy, Saccol and Reinhard (2007) delineated the most relevant issues published by Brazilian journals on m-Learning and they were four: a) technological challenges to implement mobile experiences in education, b) the effects of the use of mobiles on workers, c) the critical factors to the adoption and d) an analysis of social issues related to ubiquitous mobile technologies.

For technological challenges to implementations, the authors described cases of hardware restrictions, poor Internet connection and disruptive HCI frameworks (Dix et al., 2004) with download problems. Add to those issues, cases of bureaucracy firewalls and technophobia from pedagogical responsible agents. The second issue, the effects on workers were mostly related to 'knowledge workers', white collar executives and the situations where "essas tecnologias podem contribuir para a eficiência e eficácia no trabalho" (Saccol & Reinhard, 2007, p. 184).

We researched the diffusion of an innovation (SLA apps) in two higher educational institutions and the critical factors for the acceptance and adoption (item c above) really comes to our major attention due to its similarity to what we faced during this study. Adopting an innovation is not a simple process and the convincing pitch involved on the Interpersonnal Channel (Rogers, 1983), many times, can have an inverted effect and drive potential users away from it (Müller, 2013; Venkatesh & Davis, 2000). This very effect happened during one of our research presentations at Universidade Tiradentes with personal negative comments of technological discomfort and technophobia were voiced by some participants.

A number of papers available in education journals written in Portuguese with A1, A2, B1 (highest) ratings in CAPES and Scielo Analytics reveal other issues on the analysis of mobile learning. As a first, national m-Learning experiences are still in an embryonic phase (Oblinger, 2006) and theoretical references lack more research because “ainda é incipiente o entendimento sobre a questão da adoção de tecnologias móveis em ambientes educacionais” (Ferreira et al, 2012). For Meirelles, Tarouco & Alves (2004), three investigators who work in a common project from Universidade Federal de Santa Catarina, Universidade de São Paulo e Universidade Católica de Pelotas, researchers on m-Learning have to develop more attention to the intrinsic elements of studying with smartphones and tablets and devote some attention to “referências que abordam diferentes aspectos tecnológicos e educacionais em ambientes voltados para eventos de aprendizagem com mobilidade” (p. 2).

The second issue covered by publishing is related to hardware restrictions to the adoption of m-Learning such as cell phone battery life limitations (Fernandes et al., 2012; Sampson et al., 2013; Traxler, Barcena & Laborda, 2015) and slow processing for activities with heavy app design or small screens. These observations were perceived in the studies of Bartholo, Amaral, & Cagnin (2009). According to them, when programming virtual learning environment interfaces to be available at mobile phones it is mandatory to “selecionar as funcionalidades mais importantes dos AVAs para serem disponibilizadas devido ao tamanho da tela de cada tipo de dispositivo” (p. 40). Broadband networks in Brazil still have infra-structure limitations and we have to consider the possibility of a certain number of transmition interruptions due to hardware interferences.

The third element found in some studies refers to the Technocentrism (Burston, 2015; Chambers & Bax, 2006; Papert, 1990) presented in many academic works where the focus is the device or the networks that support it and less attention is demonstrated to the real learning necessities of the students/participants. Technocentrism was a term coined by Papert (1990) to voice “the fallacy of referring all questions to the technology”. A deluge of researches are devoted to the machine-side of the experiment whilst learners’ outcomes and feedback would be a more significant result to be observed. Pinto (2004) shines a light to the dangers of “tecnocentrismo, algo que envolve a absolutização do paradigma tecnológico e o perigo de que toda a vida do

ser humano seja regida pela racionalidade tecnológica" (p. 841). We avoided being technocentric in our presentation pitches and even so, we were able to witness bursts of rejection of the mobile technology proposed at this research at both universities. Nevertheless, many students' results reveal the reception to our ideas and the objective proposed by this study was always made clear – they would download and adopt an app to learn English by themselves on their mobile phones and provide us with feedback on that within 60-90 days. Some of them did, some did not.

The point is that adoption entails a change in attitudes (Rogers, 1983), a tolerance to deal even with the hassles and mistakes of the experience. Personally, after more than twenty years of English teaching in Brazil, one of the authors would say that educational dogmas and individual perceptions are hard to change and many people understand learning a language through a varied range of perspectives and needs. For some, it is inevitable to attend a course with a native teacher and follow textbook units to have that 'learning atmosphere' present. Hence, downloading and app and use it while commuting on a 'comboio' might not be recognized as "Learning a language" by some individuals.

Bottentuit Junior (2012), in his article "Do computador ao tablet: vantagens pedagógicas na utilização de dispositivos móveis na educação"[3], makes one of the first comparative studies between mobile learning usage in Brazil and Europe and came up to some conclusions that it did not have much significant change in five years. According to the author,

> a utilização de tablets no ensino apesar de estar em franca discussão, ainda é uma inovação no Brasil, pois apesar de se observar iniciativas em escolas e instituições de ensino superior adotando esta tecnologia, ela ainda passa por algumas resistências, principalmente daqueles professores que ainda se recusam a pensar no ensino mediado por tecnologias digitais. (Bottentuit Junior, 2012, p. 140)

According to Finardi & Porcino (2014), two researchers from Universidade Federal do Espírito Santo and part of the main group of investigators working with

[3] Authors' note: "From the computer to tablet: pedagogical advantages in using mobile gadgets in education."

technologies into English teaching; the elements found on most mobile learning experiences make use of hypertexts and these affect the way we process information. These authors believe the theory immersed on mobile experiences could involve the concepts of Situated Learning of Lave and Wenger (1991), the Sociocultural theory of Vygotsky (1986) and at the ideas of Digital Literacy by Gilster (1997). Nevertheless, Finardi and Porcino (2014) reinforce the need of more investigations on the same topic – lack of will from teachers in using mobile technologies. When it concerns the use of apps for language teaching, we still are "de forma bastante tímida e contida, por diversas razões, mas principalmente por receio e falta de formação dos professores" (Finardi & Porcino, 2014, p. 262).

Moving from a national context and entering the local arena, Sergipe, we may say that the most updated academic studies have been developed at Universidade Federal de Sergipe and Universidade Tiradentes – the two main institutions in the state. At Universidade Federal de Sergipe, the works involving mobile phones in learning are a few and they are available at a distance education journal named Revista EDaPECI – Educação a Distância e Práticas Educativas Comunicacionais e Interculturais (B3 – CAPES). One of the first relevant studies approaching mobile learning in UFS was Weber & Santos (2013) and entitled "Educação Online em tempos de mobilidade e aprendizagem ubíqua: desafios para as práticas pedagógicas na cibercultura"[4] where the authors advocate the potential of mobile platforms and ubiquity of virtual learning environments to increment opportunities for knowledge acquisition. Getting closer to the topic of this research – English learning – it is mandatory to check the work by El Kadri (2015) "Transformando a atividade de formação de professores/as de inglês: o uso da plataforma Fazgame para o ensino e formação de professores no contexto do PIBID"[5]. What we saw on this work is a proposal of videogame use in class through the platform FazGame to PIBID members. PIBID is a Brazilian government program that distributes training courses scholarships to future teachers still in graduation.

Concerning the use of mobile phones apps for English learning the findings are very incipient yet however there is a study mentioned the topic entitled "Tecnologias

[4] Authors' note: Online education in times of mobility and ubiquitous learning: challenges to pedagogical practices in cibercultura".

[5] Authors' note: "Transforming the activity of forming English teachers: the use of the Fazgame platform to the teaching and preparation of teachers in the context of PIBID".

nas aulas de Inglês: panorama histórico"[6], by Schlindwein & Sorte (2016), where the authors presented a historic panorama of the introduction of technologies into second language learning, especially when it comes to the English acquisition as well as some analysis over the penetration of social media to daily practices respecting the normalization stages of Bax (2003). Another paper concerning the use of mobiles inside the institution is "Aplicando traços de acessibilidade e usabilidade web móvel na Universidade Federal de Sergipe: respeito à cidadania e à inclusão digital"[7] by Santana, Pontes, Nunes & Silva (2012). It describes the usability of the mobile platform developed for the Post Graduation Program at UFS and the process of the university community to adopt it.

Attending the references of education in the XXI century we came across the interesting work by Lucena & Oliveira (2014) and entitled "Culturas digitais na Educação do Século XXI"[8]. The study shows results of the investigation performed by the Research Group in Education and Digital Cultures – ECult/ CNPq. On it, the author develops an observation on the ubiquity of digital gadgets and how education is being affected; it also deals with the necessity of creating an active student (Schofield, Sackville & Davey, 2006), one who is in charge of producing knowledge as much as he absorbs it.

> Trabalhar com as culturas digitais e com as tecnologias móveis na escola não é apenas usar uma nova metodologia de aprendizagem para transmitir conteúdos enfadonhos, mas é pensar nesse novo sujeito, praticante cultural que pensa, produz saberes e compartilha opiniões, conteúdos e informações nas redes. (Lucena, 2016, p. 288)

At Universidade Tiradentes journal website, it is possible to find a variety of studies illustrating examples of experiences from the e-Learning platform (Unit EaD) developed at the institution and its campi however when we researched for "mobile learning" and "mobile technology" we had a limited number of entries. The most significant were "Educação não-escolar, aprendizagem ubíqua e novas formas de

[6] Authors' note: "Technologies in English classes: a historical panorama".
[7] Authors' note: "Applying traces of accessibility and usability of mobile web at Universidade Federal de Sergipe: respect to citizenship and digital inclusion".
[8] Authors' note: "Digital cultures and education in the XXI century"

aprender"[9] by de Jesus Oliveira, de Jesus Lima, & de Magalhães Porto (2015) an updated perception of learning on a digital age and involved with ubiquity. This is relevant due to its appropriateness to our theme here and the parallelism to the perceptions our works share. According to them, institutions have to understand the student as a "sujeito que é constituído na relação com os artefatos de seu tempo" (p. 43). We understand higher education graduates of today as those app generation members mentioned before and nothing defines the artifact of their age better than a smartphone.

Finally, another paper worth the analysis was "O Twitter como recurso didático em aulas de Língua Portuguesa"[10] by Souza (2013) which verifies how the social media powerhouse can be used to teach Writing skills in Portuguese to public high school students. Difference in idioms aside, our interest was her academic comprehension of the need to creating "novos olhares sobre o trabalho docente e o quanto as metodologias tradicionais se têm afastado do contexto atual do alunado" (Souza, 2013, p. 93). On this analysis from the contributions of Brazil and Portugal, we establish a ground for our concepts and help the literature produced in both countries. To a certain perspective, this study provided a contribution to theories dealing on learning, in special, mobile learning.

[9] Authors' note: "Non-school education, ubiquitous learning and new forms of learning".
[10] Authors' note: "Twitter as a didactic resource in Portuguese language classrooms".

3 Theories on learning: the focus on ICT-based experiences

3.1 From Behaviorism to Connectivism: relevant changes

On this Chapter 3, we investigated the theories that permeate the epistemology of learning (Garrison, 2011; Paiva, 2010; Traxler, 2013) in a chronological path. From starters, a question to be signaled is that the work developed here put more emphasis on finding logical answers to the questions raised during the experiment with the participants. Implementing an m-Learning adoption of SLA to graduate students means adding some extra load to an already busy routine they have. Nevertheless, we tried to grasp most of the state-of-the-art literature available and coherent to the task and weave it to our data, establishing new paths for higher education students to acquire English inside UNL and UNIT. It was an empirical evaluation (Carneiro, Lefrere, Steffens & Underwood, 2011; Ferreira et al., 2014; Polio, 1997) to the most sense of it.

Our focus was on the quest for understanding Education, its essence in procedures and practices since the implementation of technology, in special, mobile technology and within the range of linguistics on the horizon. From the literature review, we soon realized that our study was embedded with theoretical concepts from Connectivism, a theory defined by George Siemens (2006), Associate Director of the Technology Enhanced Knowledge Research Institute at Athabasca University (Canada) and one of the most respected names when the topic is education intertwined with internet digital technologies. It encompasses theoretical concepts of knowledge and learning influenced by the network theory of Barabási (2002) and by Vygotsky (1986) and his socio-constructivism.

Developing his ideas on the concept of a network where the navigation of nodes represents the route for learning experiences, information “can reside outside of ourselves” (Siemens, 2006) and it is available today in databases and digital clouds. The question that remains partly unanswered after many studies involving e-Learning, distance learning, the influence of technology in educational processes and more recently, mobile and ubiquitous learning (u-learning) is whether all these ICT tools

involved in methods and procedures really improve learning or just represent “mere vehicles” (Anderson, 2008) to access knowledge in post-modern days. The ‘vehicle’ analogy puts into check some of the opinions that adding technology to educational processes may eliminate the deficiencies (Blake, 2008; Garrison, 2011) seen on education nowadays. In fact, ICT helps and may transform instructional procedures into more interesting or dynamic ones however; it is not the panacea (Hoy, 2011; Weller, 2011) for all problems. The same knowledge-acquisition debate was witnessed after the invention of printed books around 600 years ago and comparisons abound (Robinson, Minkin & Bolton, 1999; Stald, 2008).

As vehicles to transport these data, internet infrastructure as well as mobility and connectability provide instantaneous access to organized databases and consequently to information; the quest has been to transform this easily available information into proper knowledge (Gilbert, 2007; Hargreaves, 2003). The consensus among experts establishes the need of an effective instructional method that encompasses ICT however educators, pedagogical moguls and researchers are still on the search for the ideal formula to implement computerized instruction on our days. The desire for change of methodologies and classroom procedures is way more announced than executed, and Downes (2012) defends his change and the inclusion of ICT. Combining Connectivist thoughts, technology, mobiles and Internet in classes challenges theorists and in the words of Downes (2012), a contributor to Siemens (2006) in the development of an alternative theory,

> we know that in schools and universities students are led through a formalized and designed instructional process. We understand that some students prefer it that way, that some academics are more comfortable with the format, that most institutions require the practice. But none of this proves that the current practice is “better” that what is being described. (Downes, 2012, p. 92)

There are innumerous examples of institutions still reproducing education patterns and procedures from 1950’s which seem inadequate to correspond to the completely chaotic, non-linear and interconnected range of disciplinary knowledge at disposal on the web. When verifying Schools of Learning and what each theory understands for acquisition of knowledge, especially when it involves technologies, one

must start from the path determined by Skinner (1953) in the 1930's and his operant conditioning in Behaviorism. Skinner (1953) was interested in the works of other behaviorists as Pavlov, Thorndike and also Watson and comprehended his theory around the effects of stimuli, responses, reinforcements and punishments to learning. According to his thoughts, it is possible to indicate if someone has learned or not just by observing his/her behavior and responses to a stimulus; not taking into account what is in the mind of the learner in case. Declaring that learning is hard to detect as it happens inside a person (the "black box theory"), this theoretical concept aims at putting emphasis on observable behaviors.

Needless to say, a lot of criticism was submitted to Skinner's ideas when Behaviorism was applied to educational perspectives since not all learning is observable or it can be more representative than a mere transformation of behavior. Among the critique to the theory, its one-dimensionality perspective to understand learning (a simple behavior change) and the amount of responsibility placed to teachers who

> were led to believe that if learning was not occurring, then it was their responsibility to restructure the environment, determine the most appropriate reinforcement to promote the desired student behavior, or provide a negative reinforcement to extinguish unwanted behaviors. (Jones & Brader-Araje, 2002, p. 1)

Our analysis of the learning theories is more inclined to the ones that are used to design instructional environments: "Behaviorism, Cognitivism and Constructivism" (Siemens, 2005) as much as to Connectivism. We tried to be coherent to these concepts through these data collected from our participants who (voluntarily and autonomously) decided to learn English downloading and using the suggested SLA apps on this doctoral investigation.

After the behavior approach, theoretical ideas deployed more emphasis on cognitive aspects trying to comprehend learning via problem-solving activities, use of language and specially, thinking and transferring new information to the working memory - the ethos of Cognitivism. Opening the "black box" of behaviorists was inevitable and knowledge began to be seen as symbolic mental representations (Zhang, 2012), with information arranged in meaningful sequences or "cognitive schema that is

gradually constructed" (Bandura, 1995). 'Schema' is a vital word for Cognitivism and presents a resemblance to the underlying characteristics of a information stored on mobile devices (Koole, 2009). Cognitive learning is viewed as a gathering of inputs, managed in short term memory, and coded for long-term recall with new information fitting into the existing structures.

Beginning in the 60's, the theory is based on how the brain captures the processes and stores information and as a result, learning is seen as "the outcome of an interaction between new experiences and the structures for understanding that have already been created" (Mayes & de Freitas, 2013, p. 8). Focusing on the learning characteristics that have to be specified, some authors believe Cognitivism also affects the master role of instructors.

> Pedagogias cognitivo-behavioristas utilizam um modelo de design instrucional em que os objetivos de aprendizagem estão claramente identificados e declarados e existem à parte do aluno e do contexto de estudo, caracterizando-se pela redução do papel e da importância do professor. (Mattar, 2013, p.24)

Cognitivism has received harsh judgements for its shortening perspective to understand the mind when viewing it as a simple analogy of an ICT model; leaving aside abstract horizons, complexities and environments that certainly influence distinctive perspectives. In a digital age (Brown & Mbati, 2015; Loureiro & Rocha, 2012; Prensky, 2001; Siemens, 2006) like ours, technology enthusiasts make use of these very arguments and amplify the discourse of ICT as "indispensable tools for teaching and learning" (Friesen, 2009, p. 87).

Another theory that also permeates the synergy of online learning concepts throughout the studies of Siemens (2005), Downes (2012), Anderson (2008) and Veletsianos (2010) is Constructivism, where students develop their own understanding of things through personal experiences and "are not empty vessels to be filled with knowledge. Instead, learners are actively attempting to create meaning" (Siemens, 2005, p. 2). We have to bear in mind that ICT and gadgets are transforming classrooms around the world while educational institutions and instructional procedures are intensively searching for the adequate method to supply students' needs in the XXI century. An alternative way to grasp the definition of Constructivism is that it "is not a

theory about teaching...it is a theory about knowledge and learning...the theory defines knowledge as temporary, developmental, socially and culturally mediated, and thus, nonobjective" (Brooks & Brooks, 1999, p. vii).

Brooks and Brooks (1999) delineate the autonomy necessary to be successful in online learning experiences, be it e-Learning or m-Learning. Our research is based on participants downloading and executing activities on apps in a volitional and totally non-controlled way by this researcher; and the outcomes of the data collected solidly demonstrated how this was perceived by each one of them. Diffusion understandings, Adoption and Rejection attitudes are intertwined in experiments of this sort and are subdue to personal regulations that exist exclusively under the user's control (Garrett, 2011; Pires & Costa Filho, 2008; Weller, 2011). Seen as contextual, constructivist learning happens in a personal way to each individual, even when they are in cooperation. Constructivist perspectives have some acceptance in our investigative study since students "choose their own sequence of learning" (Anderson, 2008, p. 33). For this author's perception, the learner has to be aware of the uber-abundance of content available nowadays what contrasts to the reality of a not-so-distant past when shortage of sources was the rule. "Content resources are now so large that filtering and reducing choice is as important as provision of sufficient content itself" (Anderson, 2008, p. 53). Trimming the avalanche of data available from any online search aimed at learning or not, many times is more significant than the search itself.

Siemens (2005) asserts that technology has transformed the way we live and see things, as standards of communication have been completely redefined. Consequently, this transformation affected education and learning processes as a whole. According to him, the digital surrounds that we live is "altering (rewiring) our brains" (Siemens, 2005; Weller, 2011). If we slightly disagreed to one of Siemens' ideas, it would be the concept where "the worthiness of learning something is a meta-skill that is applied before learning itself begins". And our assertion would point to the fact that recognizing the worth or value of some information would require a background knowledge broader than that very information *per se* – which does not seem to be totally realistic in many situations.

Many important questions are raised when digital technologies influence the consolidation of learning theories for the moment we live in. Non-linearity (Picciano,

2002), fast evolution, chaotic distribution (Siemens, 2006) of text, audio, image and video through a myriad of media platforms, individual production of digital content, new linguistic approaches, this is what represents the panorama of learning today, in one word: Connectivism (Siemens, 2006).

This seems to be the most adequate theory to put into practice on current days in education. However, one must be attentive to the dangers of pointless web surfing (Downes, 2005; Siemens, 2006) and misinterpret it for a learning activity. Although learning "can reside outside of ourselves within an organization or a database" (Siemens, 2005), it is the thorough comprehension of an information that is conceptualized as 'knowledge'. No longer the need to memorize all information concerning a topic but, in fact, what to do with the data you find available on the web for that same topic.

Establishing the principles of Connectivism, Siemens (2005) proposes that learning happens through networks (Barabási, 2002) of "specialized nodes or information sources" and is delivered through the assistance of "non-human appliances". Obviously, this role of non-human appliance to deliver information today is performed by the ubiquitous presence of smartphones around us. With representative figures for the last ten years and with predictions that confirm a tendency to growth, cell phones, smartphones and portables gadgets connected to the Internet surely represent the appliance that humans will interact with for the next years. On Figure 3-1 from Statista, we can see the growth forecast of mobile Internet subscriptions for the next two years.

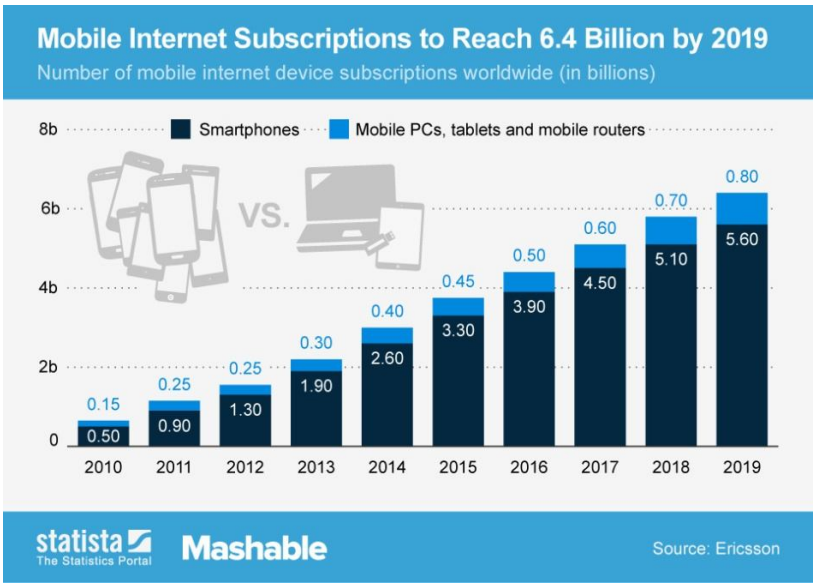


Figure 3-1: Mobile Internet Subscriptions rate estimate by Statista and Mashable 2014. (Source: Ericsson – 2014)

Another concept described by Siemens (2005) on the Connectivist Theory is that "the starting point of connectivism is the individual", and instructional procedures have to motivate this individual to discover learning by himself. It is undeniable that the strength of such an approach has some resemblance to what Papert (1996) called "home-styled learning" as opposed to "school-styled learning". As one of the main components of his motto for modern education: "a student who has a why to learn, almost any how will serve" (Papert, 1996, p.46). If this how is augmented by the unlimited possibilities of ICT, we come close to what Siemens (2005), Anderson (2008), Robinson (2013), Mitra (2006) and Downes (2005) are conceptualizing on the last decade or so.

Sugata Mitra (2006) reminds us of the necessity to permit learners explore ICT and the Internet on their own, in search of the necessary knowledge they need to execute a task, a concept he entitles Minimally Invasive Education (MIE). Mitra (2006) has dedicated his projects and studies to the development of education in remote parts of the planet and to him "it is necessary to design and develop technology that can, to whatever extent possible, provide teacher-independent education in those areas where good teachers are not willing to go" (Mitra, 2006, p.11).

On the application of a theory that works for online learning, and in special, mobile learning, we face the determinants of Heutagogy (Hase & Kenyon, 2000; Traxler, Barcena & Laborda, 2015), a conceptualization where acquisition of information happens from the interaction created by the student and the knowledge where "he finds his understanding enhanced by situations within which he constructs meaning" (de Figueiredo, 2005, p. 232). This happened when participants made use of the applications on an individualistic activity.

The mentioned tectonic transformation is led by Internet and its capillarity; especially concerning knowledge production, exchange and distribution. As Freitas (2004) observed "a densidade da informação à nossa volta é cada vez mais elevada. As tecnologias de informação vieram trazer um potencial de tratamento dessa informação, até aqui indisponível" (Freitas, 2004, p.24) and this is proving to be the hardest challenge to teaching. Now that this connectivity is everywhere due to mobiles and Wi-Fi; universities, schools and instructional institutions of any kind will have to rethink their approach to instructional methods (Kolb & Kolb, 2005) and content property. On the applications investigated, we witnessed constant updating, design improvements and HCI (Human-Computer Interface) adjustments all focused on the best performance of the apps. These observations are valid for the Trialability period of around 60 – 90 days the participants were using the applications.

Connectivism is a major force in this dissertation so it is wise to have a longer analysis on it for this Chapter. Learner-centered, student-oriented, placing the apprentice on the axis of the instruction is a key innovation from Connectivism principles. It establishes autonomy as a requirement to the apprentice and changes instructional methods long time based on the teacher or on syllabi. Centering the learning at the student and his/her needs, the major revolution has been Internet becoming "a medium, in which information was transmitted and consumed, into being a platform, in which content was created, shared, remixed, repurposed, and passed along" (Siemens, 2005).

That transformation redefines the whole mindset of knowledge access, production, storage and distribution (Kukulska-Hulme, 2010; Siemens, 2006). According to these references, learning and teaching immersed on ICT are merging into a more dialectical relationship of exchanges, research and discoveries that go beyond

computers and include multicultural integration (Oblinger, 2006), diversity and collaboration of many sorts to the fulfillment of daily activities. Freitas (2004) considers these aspects when discussing knowledge and digital learning in Portugal. In his perspective,

> hoje em dia será consensual entender que o saber não pode ser olhado nem como algo estático, nem como acessível essencialmente através de meios áudio, vídeo, scripto ou informático. O saber - e fundamentalmente o processo da sua construção - depende da dialéctica do quotidiano. (Freitas, 2004, p. 24)

Moving further into the potentialities anchored by ICT and Connectivism concepts to modify instructional processes found on the apps here suggested, we illustrate with Figures 3-2, 3-3 and 3-4 below. For this listening and speaking exercise, the resource of the Automatic Speech Recognition (ASR) (Campos & Freitas, 2016; Cucchiarini et al., 2014; Wang & Young, 2014) features not only display the content to end-users but augment it, making the exercise a lot more dynamic. If a user is planning to visit New York, learning the correct pronunciation of a tourist destination is meaningful, brings cultural awareness (Blake, 2008), and it seems logical.

Figure 3-2, Figure 3-3 and Figure 3-4: Babbel Application – Listening and Speaking activities augmented by Automatic Speech Recognition: wrong Speaking answer in Red; correct Speaking answer in Green. (Source: Babbel Application)

To Anderson (2008) and his analyses of online learning, it becomes implicit that the instructor (in our case a L2 teacher) must understand these potentialities now

involved in the pedagogical arena as learners have alternative possibilities available in the apps as the example above and can establish new paradigms of relationship to linguistic content. However, technology also “brings with it its own set of encumbrances and difficulties, and its successful implementation requires careful networks of student support” (Anderson, 2008, p. 82).

As a lucid critique to Connectivism, Verhagen (2006) sets the tone that most of the concepts present in Siemens’ theory are already established in previous theories (i.e. Connectionism; Constructivism) and technology acts more as a digital support to curriculum distribution rather than a methodological knowledge platform (Stockwell, 2010). For Clarà & Barberà (2014), connectivist perceptions oversimplify interactions regarding them as binomial and Siemens (2006) not necessarily amplified the scope of the concept and its full ontogeny (Tobergte & Curtis, 2013).

On the academic discussion of what researchers and society expect from education at the second decade of the XXI century, it is commonsensical that “we need to prepare our learners for a pervasively networked world” (Siemens, 2006; Anderson, 2008; Martinho, 2014). Educators have to be aware and fine-tuned with “app generation” patterns (Gardner & Davis, 2013) and for Downes (2012) that is where the current hindrance in contemporaneous education is found. In an informal tone, the Canadian academic makes it clear that

> I don't talk to these people about how to teach, even though the majority of them are educators. My primary concern isn't the young at all. Rather, I am most interested in these older people, these teachers, themselves. I talk to them about "How to manage your own thinking and learning." Because, I figure, if they can understand and acquire these habits themselves, they will be more able to “demonstrate” (rather than hopelessly try to tell) their student how to learn. (Downes, 2012, p. 615)

For Anderson (2008), when immersed in an m-Learning experience, students are creating an attached relationship with content due to the fact these are chosen by the learners themselves (as the New York example above), in situations and places established by them and with an open concept of time for the task execution. Classrooms walls (Blake, 2008; Costa, 2013; Ferreira et al., 2012) are step by step fading

with this uber-access (Banga & Weinhold, 2014) and it seems to be further than just adapting to a new learning methodology or gizmo for schools and higher education institutions (Collins & Halverson, 2009; Jarvis, 2001; Papert, 1996); mobile learning is about to enforce a complete redesign of educational and pedagogical roles (Santos, Beato & Aragão, 2012; Slattery, 2006) throughout education.

3.2 Higher Education Institutions and ICT Adoption: the new roles

For a better comprehension on how higher education institutions should face the sheer force of ICT entering procedures, we could bear in mind the role of H.E.I for the last five hundred years has been to provide high-end knowledge to the next generation, preparing future professionals for the labor market as well as delivering active citizens (Jarvis, 2001) for a better society. Many authors are questioning the upcoming years of these institutions concerning this entrance of ICT (Fallows & Bhanot, 2005; Fidalgo, 2012; Maia, 2003; Marçalo, Fonseca & Silva, 2010; Sampson, Isaias, Ifenthaler & Spector, 2013) in their systems, in special, the content delivery format which takes teachers away from the main central position of knowledge provider; now assumed by the Internet, to a position of communicator, entertainer, motivator and many other new "ID tags".

According to Graham and Phelps (2003), the "changing role of teachers, together with the increased demands and expectations placed upon them, will significantly influence the types of knowledge teachers require in their undergraduate education and ongoing professional development" (Graham & Phelps, 2003, p. 12). Some experts believe that redesigning the role of professors (Bax, 2003; Jurkovič, 2006, Pennington, 2002) is inevitable nowadays after the brutal adjustments technology arrival (Bauerlein, 2011; Weller, 2011) is imposing to the profession. Teachers now have to develop some knowledge on handling the latest gadgets and understanding software, they must verify how their area of expertise is transformed by distance learning and mobile learning realities in different countries or, at least, they have to keep up with the latest researches in their field of science. According to Garrison (2011),

> The responsibilities of teaching in any context are complex and multifaceted. They include being a subject matter expert, an educational designer, a social facilitator and a teacher. However, as has been noted, the liberating frame of e-learning significantly alters how these responsibilities are fulfilled. (Garrison, 2011, p. 65)

We share the transformative perspectives of authors like Kukulska-Hulme and Traxler (2005) about the coming years of these institutions witnessing that "large-scale mobile learning also provokes some philosophical questions about the role of universities and colleges, about the nature of their core business and the nature of their role within their host communities" (p. 185). We also subscribe to the comprehension proposed by Ortega and Bagnato (2015) that higher education institutions have to be in the forefront of innovative research and "should be generators of knowledge, which when appropriately processed becomes capable of generating direct benefits for society, they should assume a leading role in the process of practical innovation" (p. 2).

Nonetheless, there is a heavy burden on these academic institutions provoked by the conclusion that "contemporary knowledge-based society is causing strain on the more traditional institutions" (Jarvis, 2001, p. 1); and this strain demands colleges and universities to re-design their mission as much as to reorient professors and instructors to assess their practices (Ceia, 2013) while trying to fit into the "millennials" mental model and life style. Pedagogical times have changed and "education has shifted from the teacher to the learner" (Jarvis, 2001, p. 17). The importance of knowledge acquisition to score a good job in the XXI century society is crystal clear and some authors already encompass knowledge as a very valuable commodity for the "Knowledge Society". As Lyotard (1984) put it,

> knowledge in the form of an informational commodity indispensable to productive power is already, and will continue to be, a major – perhaps the major – stake in the world-wide competition for power. It is conceivable that nation-states will one day fight for the control of information, just as they battled in the past for the control of territory. (Lyotard, 1984, p. 126)

Concerning the age of teachers, Hargreaves (2003) developed concepts that university professors entering the institutions nowadays are younger than in the past

since retirement is sending home many teachers from the previous generation. The hardest question to answer is whether these young teachers are receiving enough information and preparing themselves to be able to enlighten the app generation that will be at the workforce later on. According to the author, "teaching is becoming a young person's profession again. Whoever enters teaching, and however they approach their work, will shape the profession and what it is able to achieve with our children for the next thirty years" (Hargreaves, 2003, p. 13).

After all, in this adjustment of HEI to technologies - mobile or not, it rapidly becomes clear that we also have to ponder over the role of the learner. Most of the literature emphasizes terms that are concerned with this new position of the learner in pedagogical and educational contexts. Terms such as content-driven (Blake, 2008; Brown & Mbati, 2015; Hargreaves, 2003), learner autonomy (Benson, 2007; Little, 2007; Kumaravadivelu, 1994; Santos, Beato & Aragão, 2012), ubiquity (Kukulska-Hulme, 2009; Kurtz et al., 2015; Valk, Rashid & Elder, 2010; Traxler, 2013) and a "big picture" mentality (Buckingham, 2008; Hargreaves, 2003; Siemens, 2005) are all prerequisites of the learner in the XXI century, be it for language learning or any other topic. On the down side, a lot of responsibility is put on student's shoulders now and some institutions are taking advantage of this reality, disguising their unqualified teachers with content delivery via the internet. Moreover, a leadership position on the learning process is placed over the students who may not be ready for it yet.

3.3 A Unified Theory: Technology Acceptance Model in correlation to Technology Readiness for the adoption of mobile learning

On this subchapter, we offer our original contribution to knowledge as a PhD dissertation formulating an adaptation to a theoretical perspective on the mobile learning experiment we promoted within Universidade Tiradentes and Universidade Nova de Lisboa. We focused on understanding how our participants understood the knowledge and were persuaded (Rogers, 1983; Sahin, 2006) to adopt a second language acquisition mobile application into their mobile phone daily use (Jarvis & Krashen, 2014; Kurtz et al., 2015; Wu, 2015).

We tried to conceptualize determinants over their rates of Acceptance, Adoption and Rejection of the applications (Rogers, 1983; Moore & Benbasat, 1991; Sahin, 2006) as end-users of the empirical study, based on literature and responses they provided. In order to verify this effective acceptance, adoption and system use (Dias, da Silva, Delfino Jr, & de Almeida, 2011; Mun & Hwang, 2003; Venkatesh & Bala, 2008; Venkatesh & Davis, 2000) of the apps, we presented the concept of the applications in live presentations to graduates who voluntarily attended them and were asked to download and make use of the mobile applications. After a 60-90 days period, the authors collected answers about this usage and the hindering aspects during it.

According to Akbar (2013), the referential literature on technology is transforming higher-education and has been devoted to themes such as "faculty and peers encouragement (Martins & Kellermanns, 2004)...TOE (technological, organizational and environmental) factors (Mills, 2008), educational compatibility (Chen, 2013), among others on the acceptance, diffusion, use, or effectiveness of technology" (p. 4). We dedicated this investigation to understand which constructs can influence the adoption and use of a new technology such as SLA apps.

Hence, we formulated an adaptation to the concept of acceptance by Venkatesh and Davis (2000), Venkatesh *et al.* (2003) for a Unified Theory for the Acceptance and Use of Technology (UTAUT) but adding 'M' to the acronym, as our study focused exclusively on the adoption of mobile technologies. As mentioned previously, we assessed whether smartphone end-users adopted applications for second language acquisition. The formulation we adapted and labeled UTAUT+M is based on three conceptual paradigms: first, the notion of Perceived Usefulness and Perceived Ease of Use (Davis, 1989; Dias, da Silva, Delfino Jr, & de Almeida, 2011; Venkatesh & Bala, 2008; Venkatesh & Davis, 2000) of the SLA apps which conduct users to the acceptance and adoption (or not) of this innovation (Meirelles & Tarouco, 2005; Rogers, 1983; Saccol & Reinhard, 2007; Sahin, 2006).

In our proposal, adoption is also positively influenced by the second concept, the index of Technology Readiness (Martinho, 2014; Parasuraman, 2000: Parasuraman & Colby, 2015) demonstrated by the participants for acquiring L2 using smartphones as a learning tool. Explaining it further, this UTAUT+M encompasses an integrative approach to concepts from Technology Acceptance Model (TAM), a theory designed by Davis

(1989), extended to TAM 2 by Venkatesh & Davis (2000) and again extended to TAM 3 by Venkatesh and Bala (2008). TAM is interconnected with some principles of Innovation Diffusion Theory or IDT (Lee, Hsieh & Hsu, 2011; Rogers, 1983; Sahin, 2006), in special, how the Innovation Decision Process, composed of Knowledge and Persuasion, affects Behavior Intention and consequently Adoption (or Rejection) of the technology proposed.

TAM and IDT work together with the third concept, the Technology Readiness Index of Parasuraman (2000) and Parasuraman and Colby (2015) that acts as a determinant to the aforementioned concepts of perception and acceptance. The successful result of merging these theories provided a better comprehension of end-users that adopted (or not) the SLA applications.

Adoption is a behavior understood and influenced by the Theory of Reasoned Action – TRA (Bandura, 1995; Fishbein & Ajzen, 1975; Martinho, 2014), a concept strongly connected to social psychology and to the analysis of volitional beliefs and intentions to an action. According to TRA (Fishbein & Ajzen, 1975), an action is always preceded by the intention to perform it and perceiving the possible outcomes from this very action work as a motivator to a behavior intention, as seen on Figure 3-5. Venkatesh et al. (2003) also discussed this intention when it is related to information technology.

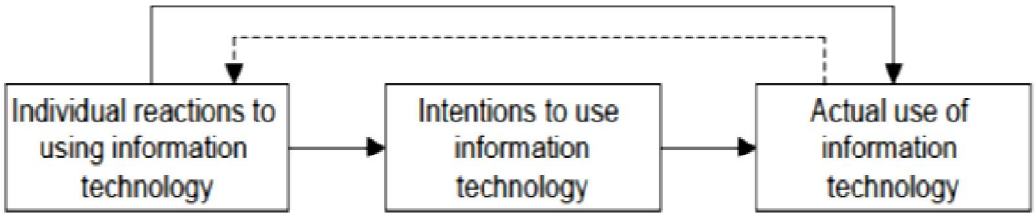


Figure 3-5: Basic concept underlying user acceptance model by Venkatesh et al., 2003. (Source: Venkatesh et al., 2003).

Yet according to Venkatesh et al., 2003, Attitudes and Subjective Norms interfere in behavior intention; Attitude classifies behaviors as positive and negative in a rewarding pattern whereas Subjective Norms are “the person’s perception that most

people who are important to him think he should or should not perform the behavior in question" (Fishbein & Ajzen, 1975, p. 302) and we questioned participants about this. Theory of Reasoned Action is a theory that has resonance to Individual Acceptance which to the authors concerns only to aspects involved with technology (Agarwal & Prasad, 1999, Marques, 2015) and its volitional adoption (Nikou & Economides, 2014). The limitations to TRA are significant when "dealing with behaviors over which people have incomplete volitional control" (Ajzen, 1991, p.181), which is not the case in point to our research.

TRA was later extended into the Theory of Planned Behavior – TPB (Ajzen, 1991) with the inclusion of the construct of Perceived Behavioral Control or "the perceived ease or difficulty of performing the behavior of interest" (Ajzen 1991, p. 183). TPB has been used to the comprehension of individual acceptance (Agarwal & Prasad, 1999) and volitional usage of technologies. Concerning this, Cheon, Lee, Crooks and Song (2012) developed an interesting study relating readiness, TPB and mobile learning. As a theory of "Planned Behavior", it asserts that "behavioral achievement" relies on individual motivation and that behaviors also control the action. Critics of the theory shed light to some limitations and absence of variables on it that alter behaviors as mood swings (Stald, 2008), past experiences or fear. The theory does not take into account factors linked to economic reasons or environment issues either. Nevertheless, TRA and TPB contributed immensely to the ontogeny of Technology Acceptance Models (Davis, 1989; Venkatesh & Bala, 2008; Venkatesh & Davis, 2000) and their derivative works.

The approach to TAM (Venkatesh & Bala, 2008; Venkatesh & Davis, 2000) and IDT (Akbar, 2013; Rogers, 1983; Sahin, 2006) proposed through this investigative study is a contribution to the technology acceptance literature by intertwining them with the conceptualizations of Technology Readiness Index (1.0) developed by Parasuraman (2000) and streamlined to TRI 2.0 by Parasuraman & Colby (2015). Our formulated proposal delivers a triangulation of elements from these theories (TAM, IDT, TRI) blended into the same UTAUT; providing the determinants and theoretical constructs (Akbar, 2013; Martinho, 2014; Pires & Costa Filho, 2008; Van Raaij & Scheppers, 2008) that led to the Behavior Intention, Acceptance, Adoption and (System) Use of one or more of the five applications selected to UNIT and UNL participants during the period of two and three months.

Our theoretical framework was designed including two technology acceptance model beliefs that are taken as theoretical constructs or primordial determinants (Davis, 1989; Venkatesh & Davis, 2000) to achieve adequate behavior intention and adoption: Perceived Usefulness and Perceived Ease of Use (Ahmad, 2014; Davis, 1989; Dias et al., 2011; Kurtz et al., 2015; Pires & Costa Filho, 2008; Venkatesh & Davis, 2000). On the first version of TAM, both determinants act on the Behavior Intention to Use and consequently, on the actual Use of the System as seen on Figure 3-6.

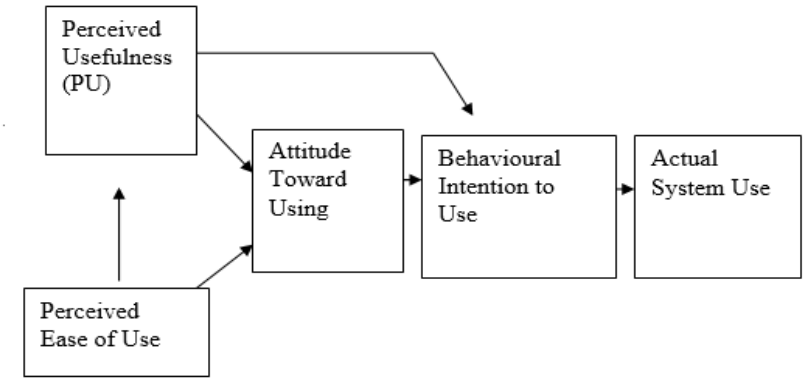


Figure 3-6: Original Technology Acceptance Model – TAM 1. (Source: Davis, 1989)

Perceived Usefulness (PU) is a fundamental prompter of usage intention and translates "the extent to which a person believes that using the system will enhance his or her job performance" (Davis, 1989, p. 320; Venkatesh & Davis, 2000, p. 187). It is suitable to point out that we observed and analyzed it as an enhancement to learning performance reflected through a "positive use-performance relationship" (Davis, 1989, p. 321) by the participants. For Davis (1989), Perceived Usefulness has a resemblance to Bandura's (1995) theory of Self-Efficacy, in special on the judgment made to outcomes resulted from previous performances. These outcomes, when positive, consolidate the perception of usefulness (Venkatesh et al., 2003) of the new technology. For Bandura (1995), Self-Efficacy is "conceived of not as a domain-specific or situation-specific cognition but as a traitlike general sense of confidence in one's own capabilities to master different types of environmental demands" (Bandura, 1995, p. 177). PU has been widely employed for the measurement of usage intention and as Voluntariness of Use was posited as a moderating variable in our formulated UTAUT+M, we are analyzing

this “usefulness” perception through an autonomous, uncompelled and volitional use (Bottentuit Junior, 2014; Onoda, 2011; Perez, Zilber, Cesar, Lex & Medeiros Jr, 2012; Pintrich, 2004) of the new technology and not a compulsory utilization as it happens to some corporate IT end-users.

For Perceived Ease of Use (PEU) we understand “the extent to which a person believes that using the system will be free of effort” (Davis, 1989; Venkatesh & Davis, 2000). PEU is a cognitive instrumental process and a primary determinant of Perceived Usefulness. It assumes the concept that the less effort a system requires from the end-users, the more it may be used by them. In our case, when analyzing adoption to an app for second language acquisition, the less complicated Babbel, Busuu, British Council, Duolingo or Speak English Daily was seen by our participants, the more intention to be used this very app promoted (Carvalho et al., 2012; Park, 2009; Venkateh et al., 2003). There is a straight, symbiotic relationship between Perceived Ease of Use and Perceived Usefulness with the first augmenting the intensity of the latter, according to Davis (1989), Venkatesh and Bala (2008), Pires & Costa Filho (2008), Kurtz et al. (2015).

Although literature brings PEU as a component for Perceived Use, we decided to analyse both independently and in parallel due to the modification we determined replacing the theoretical construct Facilitating Conditions (Wang, Wu & Wang, 2009; Ahmad, 2014; Pires & Costa Filho, 2008) for Hindering Conditions (Eickelmann, 2011; Marçal, Andrade & Rios, 2005). As mentioned before, a lot of studies bring elements that facilitate the rate of adoption thus we decided for assessing which issues potentially hinder or hamper mobile learning (Cheon et al., 2012; Sharples, 2000; Traxler, 2009) in SLA apps.

We made an assumption that the more participants perceive usefulness in the application technology, the more positive their acceptance, therefore PU and PEU exert an important effect on volitional, self-determined adoption (Pires & Costa Filho, 2008; Moore & Benbasat, 1991; Nikou & Economides, 2014; Noels et al., 2000) of technologies. We devoted special attention to the voluntariness of this adoption and interfered as less as possible during our investigation; avoiding to corrupt any personal decision of the participants and create on them an intention to “provide answers that make them look good or feel better” (Phakiti, 2014, p. 131) in relation to the researcher, therefore masquerading real results. Knowledge and Persuasion (stages of the Innovation

Decision Process) were done according to literature and will be later detailed in the Methodology Chapter.

When extending from TAM 1 to TAM 2, Venkatesh and Davis (2000) included some new constructs at the Model for an enhancement of the previous one, and integrating elements such as Voluntariness, Experience, Subjective Norm, Image, Job Relevance, Output Quality and Result Demonstrability as on Figure 3-7 below. These theoretical constructs augment social influence processes (Image, Voluntariness and Subjective Norm) as well as cognitive instrumental processes – Job Relevance, Result Demonstrability, Output Quality, Experience (Venkatesh & Davis, 2000; Park, 2009; Muller, 2013) as seen on the figure.

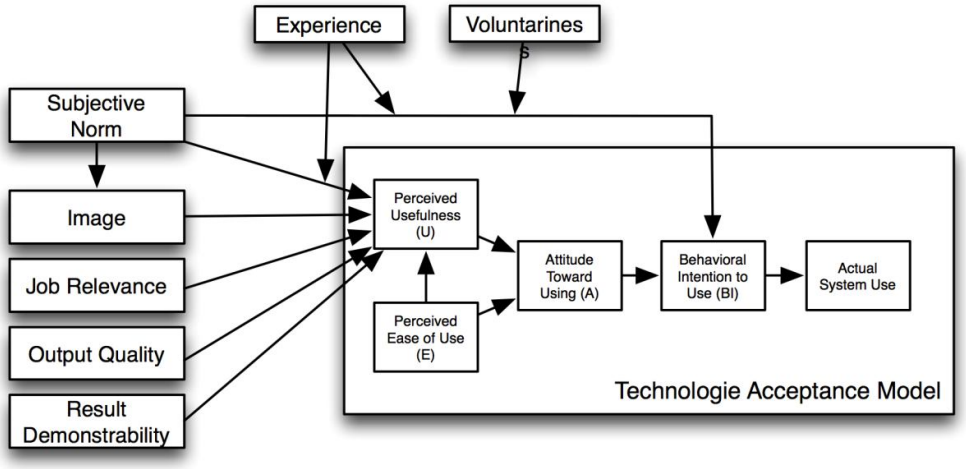


Figure 3-7: Proposed TAM 2: Extension of the Technology Acceptance Model 1.
(Source: Venkatesh & Davis, 2000)

Although TAM 2 model has been extended to TAM 3 in a study by Venkatesh and Bala (2008), this specific #3 model aims at covering "a research agenda focused on potential pre- and post-implementation interventions that could enhance employees' adoption and use of IT" (Venkatesh & Bala, 2008, p. 301). It helps to define how corporations and managerial decisions should act in order to have a high rate of acceptance, adoption and use of determined IT, in case of a mandatory adoption.

Nevertheless, there are some parallel concepts that could easily fit educational purposes.

In the search for the pertinent determinants and attributes to design our proposed UTAUT+M, we adopted the Theoretical Framework developed by Venkatesh, Morris, Davis & Davis (2003) where four theoretical constructs influence the use of new technologies and work as determinants: Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions. These constructs have relationships with key moderating factors such as Gender, Age, Experience and Voluntariness of Use as seen in Figure 3-8 below. Voluntariness of Use is a key determinant to the authors as appropriate studies, including Venkatesh et al. (2003), researched mandatory or voluntary usage of new technologies. We, in this investigation, focus on the volitional, self-determined and non-compulsory adoption of the apps. We observe MALL as an autonomous and individualized act of learning born from an authentic necessity/desire to know the L2 language. If the use of SLA apps is imposed by educational institutions or business companies, there are a lot of linguistic outcomes that do not reflect a "situational authenticity" (Bachman, 1991; Chapelle & Douglas, 2005; Martins, 2012).

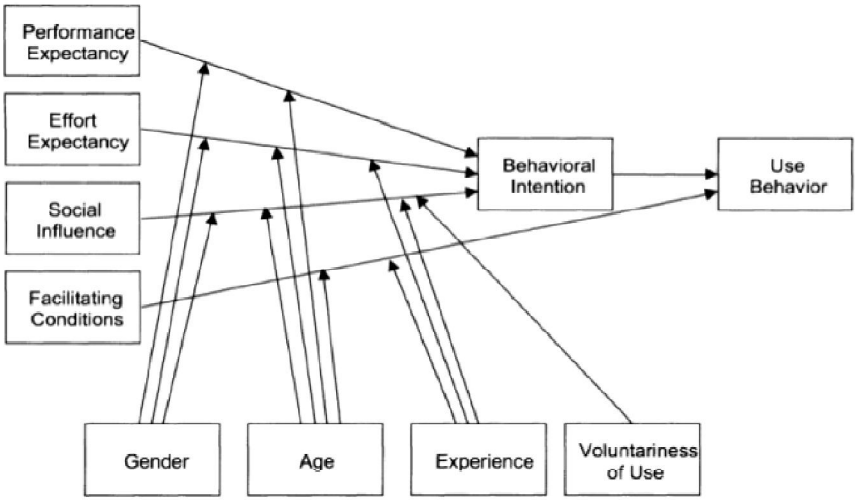


Figure 3-8: Theoretical Framework for the development of a UTAUT. (Source: Venkatesh, Morris, Davis & Davis, 2003)

Performance Expectancy – PE (Venkatesh et al., 2003) represents the "degree to which an individual believes that using the system will help him or her to attain gains in

job performance" (Venkatesh et al., 2003, p. 447). We understood this performance expectancy as translated into advantages in using one of the selected SLA apps to be more productive in L2 learning. Other authors (Ahmad, 2014; Bobsin, Vicentini & Rech, 2009; Dias et al., 2011) also analyzed this framework and subscribe to the concept that another characteristic; Effort Expectancy (EE) corresponds to the "degree of ease associated with the use of the system" (Venkatesh et al., 2003).

If an individual believes that the opinion of other people who he/she considers important matters and makes him try and use some new technology, we are under the premises of Social Influence (SI). For Facilitating Conditions (FC), researchers delineate a broader concept and comprehend we are dealing with the "degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system" (Venkatesh et al., 2003, p. 453). Gender and Age have been factors that affected behaviors on using technology however as we are in 2017, we have seen that this "gender difference" (Cheon et al., 2012; Ling, 2004; Wang, Wu & Wang, 2009) has become narrower.

Experience is a moderator that represents individuality in such a specific way that we left it aside in our UTAUT+M but Voluntariness of Use is an important component in our epistemology. As it was mentioned, we understand this voluntariness as an element that nurtures the adequate perspective we have about MALL: learner-centered, bite-sized and autonomous (Gilbert, 2007; Traxler, 2013). For Moore and Benbasat (1991), Voluntariness of Use corresponds to the "degree to which use of the innovation is perceived as being voluntary or of free will". It was extremely important to verify how graduates use their free will in adopting the apps suggested by the authors because it fits appropriately to the UTAUT+M we formulated.

In our pedagogical arena for the experiment at UNIT and UNL, TAM 2 model was a better option and used as a pillar to our nomological network proposal for a formulated adaptation as an UTAUT+M. This proposed model we designed brings a form of intervention to "pedagogical knowledge" (Carlão, 2009; Hubbard & Levy, 2006; Kumaravadivelu, 1994; Kwan et al., 2011; Ronau, Rakes & Niess, 2012; Silva et al., 2014) in learning a 2nd language and a contribution to the literature that "notwithstanding the plethora of IT adoption studies, there has been limited research on the interventions that can potentially lead to greater acceptance and use of IT" (Venkatesh, 1999).

The theoretical determinants that come from TAM 2 to our adaptation UTAUT+M are blended with components of another theory – Innovation Diffusion Theory (de Jesus Oliveira, de Jesus Lima, & de Magalhães Porto, 2015; Ferreira et al., 2012; Paiva, 2010; Rogers, 1983; Sahin, 2006) with some attention to the stages that happen before the Innovation Decision Process (Rogers, 1983; Sahin, 2006) which in itself acts as a "catalyst" for the behavior intention and consequently to the acceptance of the SLA application. These stages are necessary to the flow of concepts that lead to the very adoption. It begins with the Communication Channels whose first step is Knowledge; the individual "is exposed to the innovation's existence and gains some understanding of how it functions" (Rogers, 1983, p. 164). A few analysts believe this awareness of an innovation (Hubbard & Levy, 2006; Kenning, 2007) is a passive perspective because it is hard to search for an innovation unless you are familiar with its existence. Others have a dissonant comprehension and understand that, in short, people "tend to expose themselves to ideas that are in accordance with their interests, needs, or existing attitudes" (Rogers, 1983, p. 166). This Knowledge is the search and processing of information aimed at decreasing the levels of hesitation about the pros and cons for the adoption of an innovation. It is relevant to mention that this knowledge is divided into two types: the How-to Knowledge, consisting of the necessary orientation to use the innovation adequately, and the Principle Knowledge which involves understanding the "functioning principles underlying how the innovation works" (Rogers, 1983, p. 168) as in Figure 3-9 next.

The following stage is Persuasion, where individuals start to form an opinion and develop "a favorable or unfavorable attitude toward the innovation" (Rogers, 1983). Clearly, we are dealing here with a situation where the end-user gets more "psychologically involved with the innovation" and start searching data on the Relative Advantage, Compatibility and Complexity (Rogers, 1983) as attributes or benefits of the new technology. The Decision-Process stage is the moment when the end-user acts in choosing to adopt or reject an innovation. According to the author of these concepts, "Adoption is a decision to make full use of an innovation as the best course of action available. Rejection is a decision not to adopt an innovation" (Rogers, 1983, p. 172). This adoption may be a small-scale trial period that the user has in order to decide for the perceived usefulness of the technology and this was exactly what we promoted in this empirical study.

We observed this fact with some participants who downloaded the app, tried it out for some days and discontinued its use afterwards. Some further studies could assess the reasons why this "disenchantment discontinuance" (Rogers, 1983; Sahin, 2006; York & Turcotte, 2015) happens, perhaps due to participants not perceiving any relative advantage or a lack of satisfaction in using the technology in case. Nevertheless, some participants (44%) also demonstrated a desire to retry the app after discontinuing its use as it is mentioned on the meaningful feedback provided from their experiences available at Questionnaire 04 – Question 03 (see Annex).

Implementation and Confirmation are stages that come after the Decision (to Adopt or Reject) however our main concern in our UTAUT+M was on how this Decision Process affects the Behavior Intention of participants to adopt the SLA app in question. On Figure 3-9, it is possible to verify how Communication Channels (Rogers, 1983) develop their stages aiming at the Confirmation of the Adoption which is later translated into System Use.

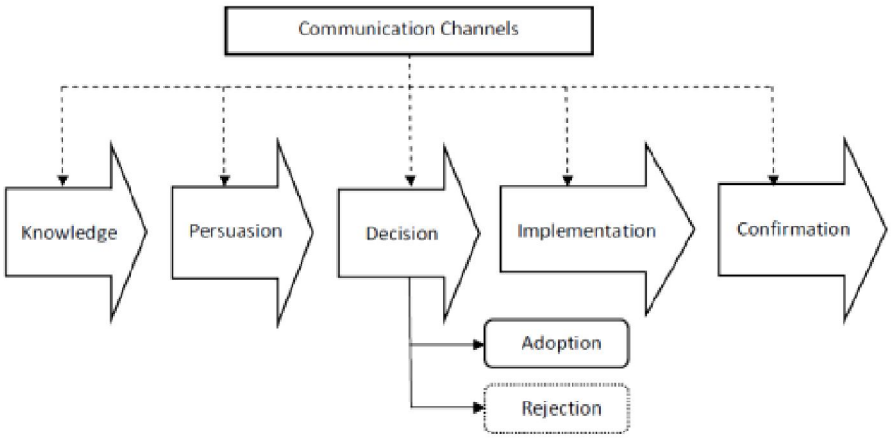


Figure 3-9: Adaptation of Communication Channels and their Stages. (Source: Rogers, 1983).

The third theory which aggregates components to our nomological network of the determinants on the proposal for a UTAUT+M is Technology Readiness (Martinho, 2014; Parasuraman, 2000; Parasuraman & Colby, 2015; Pires & Costa Filho, 2008; Shorfuzzaman & Alhussein, 2016) and its "gestalt of mental motivators and inhibitors that collectively determine a person's predisposition to use new technologies"

(Parasuraman, 2000, p. 60). With four different dimensions, the construct devises aspects of Optimism, Innovativeness – on a positive bias for the Readiness; and also understands Discomfort and Insecurity as negative biased perspectives.

TRI 1.0 is the Technology Readiness Index proposed by Parasuraman (2000) to verify and assess "people's propensity to embrace and use new technologies for accomplishing goals in home life and at work" (Parasuraman 2000, p. 308). In other words, it verifies how ready a population is to accept a new technology. It was composed of 36 statements that monitored "behaviors, intentions and preferences" (Parasuraman & Colby, 2015) divided into two dimensions that represent concepts of motivation - Optimism, Innovativeness and other two dimensions that act as inhibitors to the adoption: Insecurity and Discomfort (Parasuraman & Colby, 2015).

As technology environment evolved exponentially over the last 15 years, Parasuraman (2000) felt a necessity of updating the statements as well as designing a shorter version with a 16-item scale as complaints about the previous 36-item scale were common. Factors that are Motivators and Inhibitors were underlying this analysis for the Adoption whereas Validity and Reliability were empirically verified. During the production of our questionnaires, we had in mind the necessity for determining how much readiness would be demonstrated by participants before and after the 60-90 days; and ended up producing ten (10) assertions, five of them containing concepts of optimism and innovativeness and another five composed of conjectures on insecurity and discomfort, that were rated in a Likert scale in Questionnaire 3.

On Figure 3-10, we bring our contribution as a Unified Theory for the Acceptance and Use of Technology *for Mobiles*, a research model formulated as a UTAUT+M. It blends the Decision Process concept of Innovation Diffusion Theory (Rogers, 1983; Sahin, 2006) to Technology Readiness (Parasuraman, 2000; Parasuraman & Colby, 2015) for mobile learning working as a determinant factor to the Technology Acceptance Model (Davis, 1989; Venkatesh & Davis, 2000).

Acceptance Model studies in mobile learning for English language education should include an Innovation Decision Process, in special its Knowledge and Persuasion stages due to the relevance that informing users about the new technology has to potential adoption (Rogers, 1983; Sahin, 2006). It is also necessary to be aware of technology readiness for future adopters of an SLA virtual learning environment. As a

second original contribution from our formulated UTAUT+M, we focused on the influence of Hindering Conditions to this perception of usage, acceptance and adoption, in opposition to Facilitating Conditions; found in many works in literature.

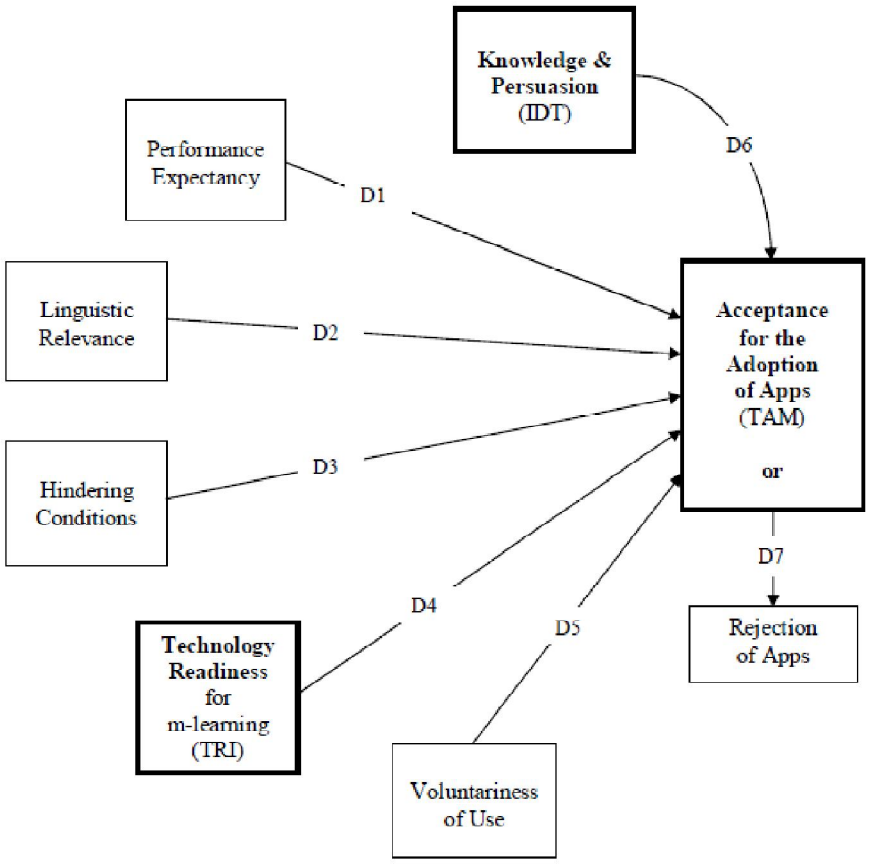


Figure 3-10: Adapting Variables and Determinants in the formulated UTAUT+M for this study.

As Performance Expectancy, Technology Readiness, Voluntariness of Use, Innovation Decision Process, Behavior Intention, Perceived Usefulness and Perceived Ease of Use had their definitions covered previously, we dedicate the next lines to explain what is understood for the constructs we implemented as original contribution – Linguistic Relevance (LR) and Hindering Conditions (HC). Linguistic Relevance (Brown, 2000; Chomsky, 1955; Davis, 1999; Krashen, 1981) is understood here as the importance English learning has to the potential end-user of the app, especially for linguistic competence as in terms expressed by Chomsky (1955); be it for grammatical

and proficiency assessment reasons or for a next vacation travel; the relevance of the linguistic outcome (Kenning, 2007; McKenzie, 2010) produced by an app is one of the main reasons that attracts potential users to it. If linguistic experiences available on the apps (Babbel, British Council, Busuu, Duolingo and Speak English Daily) match the language needs of users, they may draw people to download, adopt and use them.

Linguistic Relevance (LR) as a determinant was measured with questions about the personal reasons for learning English and asking participants about difficulties they have in relation to L2 skills (Listening, Reading, Speaking and Writing). We also had a 10-question proficiency test that helped the investigators to perceive the linguistic necessities that were unknown from each participant. The other original construct in our research is the replacement of Facilitating Conditions from the original Theoretical Framework designed by Venkatesh, Morris Davis & Davis (2003) and, in many cases, used in researches that lean to a positive bias and possible successful adoption (Bobsin, Vicentini & Rech, 2009; Rogers, 1983; Sahin, 2006). Instead of assessing facilitating aspects, we evaluated the hindering elements to adoption.

For Hindering Conditions (HC), we assessed which attributes disturbed, hampered or delayed the adoption of the apps. It was measured through questions related to smartphone limitations as learning tools (i.e., small screens, methodology, slow connections) and also via personal constraints partakers may have in understanding technology. Answers to these issues follow on the results available and are detailed in Chapter 6. To evaluate the larger scope of hindering conditions as a determinant, we questioned partakers how they felt if content is only delivered online, forcing teachers and university professors to redesign their roles to become more of a coach, mentor or mediator in class.

Constraints to this proposed acceptance and adoption may come from the high level of Voluntariness involved as we did not try to forcefully get participants into using the apps. In order to fulfill the knowledge and persuasion stages of IDT, we made live presentations of the research objectives and of the applications characteristics in selected classrooms and libraries of both Universities (UNL and UNIT) to the volunteers who answered to the newsletter or email invitations. After presenting the apps and the objectives of this study, we distributed printed copies of the Questionnaire 1 (participant profile), Questionnaire 2 (proficiency test) and Questionnaire 3 (technology

readiness index). We distributed flyers and posters explaining what the research was about on murals in both campi of UNL (FCT and FCSH) and on both campi of UNIT (Farolândia and Campus Centro) in order to attract more graduates who missed the emails.

In Brasil, we contacted all English Language, Petroleum Engineering and Biomedicine graduate students at UNIT and in Portugal, at FCT and FCSH (UNL), we reached potential voluntary participants through an official newsletter distributed to all FCT and FCSH alumni by Divisão de Comunicação. After the personal, face to face contacts at the presentations, we executed a follow-up contact via 3 whatsapp messages and 3 Google forms reminders to recall those who did not deliver the Questionnaires 1, 2 and 3 after presentations. Questionnaire 4, sent to participants after 60-90 days of the trial period, provided meaningful feedback about which application(s) participants adopted and used, for how often they have been used as well as which was the negative aspect in using smartphones as a learning tool. As last information, we inquired about the opinion participants had of the live presentations where knowledge and persuasion were deployed by the authors.

To understand how these Determinants D1 to D7 (Akbar, 2013; Martinho, 2014; Pires & Costa Filho, 2008; Van Raaij & Scheppers, 2008) on Figure 3-10 are defined in this study more information is available in the methodology Chapter. Nonetheless, we understand Determinant 1 – Performance Expectancy (PE) to have a positive influence on acceptance and adoption of apps relating the advantages of learning the language on smartphones and the productivity (Joseph, Corbeil & Valdes-Corbeil, 2007) when studying with ICT. For Determinant D2, we investigated the Linguistic Relevance (LR) inquiring about the reasons to study the idiom and the linguistic difficulties participants expressed.

Our original contribution as a PhD research comes next, when we assessed Determinant 3 – Hindering Conditions (HC); and examined the negative aspects of using cell phones to learn while most of literature deals with “facilitating conditions”. To have this semantical opposition was necessary to reveal particular aspects worth mentioning for the study. HC also considered the subjective norm of ICT use in asking partakers if there is a social embarrassment (for them) when showing lack of knowledge (Ajzen, 2002) with their smartphones.

For D4, Technology Readiness for mobile learning, we assessed how comfortable and ready individuals were in using their smartphones (Elliott, Hall & Meng, 2008) to learn the language and how they react to online content delivery, available in many HEI. This is a fundamental component of the formulated UTAUT we proposed because it is where we try to define how ready (Parasuraman, 2000; Parasuraman & Colby, 2015) participants seemed to be for a real mobile learning experience; hence we considered our adaptation to be a UTAUT+M. Many of the partakers mentioned it would be their first time attempting to learn an idiom through the use of mobile phones. The uniqueness of this SLA experience for them (Zhang, 2012) helped us to understand how the apps' acceptance worked and especially, how participants adopted and used the applications.

For Determinant 5, it was evaluated the Voluntariness of Use expressed by the available time they could put into this m-Learning experience and how they react to flexible schedules to study. In order to comprehend which opinion participants had about the live presentations, where the characteristics of the apps and the objectives of the research were demonstrated, we developed Determinant 6. Finally, after checking the rates of acceptance and adoption expressed on the data analysis, we calculated how Rejection to apps is expressed and defined Determinant 7; more details are in subchapter 5.3.

In fact, for the acceptance and adoption of mobile learning environments, users have to express a certain degree of independence and make use of Self-Regulated Learning Strategies. To voluntarily adopt an app, there is a great deal of autonomy, self-motivation (Benson, 2007; Castro, 2007; Green & Hannon, 2007; Murray, Gao & Lamb, 2011) and determination (Davies, 1999; Nikou & Economides, 2014; Schunk, 2012) in order to establish a digital and linguistic relationship to the application. These psychological traits (Bandura, 1995; Phakiti, 2014) are fundamental to a successful adoption of any new technology and as virtual learning environments (Dyson & Campello, 2003: Müller, 2013; de Figueiredo, 2005) are designed to present open educational settings (Freitas, 2004; Gu, Gu & Laffey, 2011; Nóvoa, 2009; Weller, 2011) to potential learners, we must shine some light over the topic.

The first feedback after the live presentations in both campi of UNL and UNIT indicated that students perceived the VLE of the apps as environments that resonate to

their willingness (Shorfuzzaman & Alhussein, 2016) to learn the language and as a new format to acquire vocabulary, socio-linguistic utterances and grammatical aspects (Lobato, 2013; Santos, Beato & Aragão, 2012). We ought to understand that VLEs and more recently Mobile Learning Environments (MLEs) bring an unorthodox horizon to knowledge acquisition and the same scope has to be established to Second Language Acquisition. On this rearrangement of learning principles, ICT and the digitalization of life (Horst & Miller, 2013; Thomas, 2011) are playing a major role because "children and young adults are establishing a relationship to knowledge gathering nowadays which is alien to their parents and teachers" (Green and Hannon, 2007, p. 38).

For alien, we could understand "informal" (Hargreaves, 2003; Campos & Freitas, 2015; Koole, 2009) or "incidental" (Marsick & Watkins, 2001; Jarvis, 2008) as this knowledge is now gathered through a multitude of platforms presented in desktop computers, notebooks, smartphones and tablets integrating audios, texts, videos, chats, photos, social media, videopodcasts, webcasting and hyperlinks altogether (Anderson, 2008; Campos, 2012; Carlão, 2009; Freitas, 2004: Papert, 1996; Tapscott, 1998). As paradigms are being broken, the term "virtual" in VLEs has no semantical contrast or opposition to 'real' – generally seen in educational academic conceptualizations as the face-to-face classroom presence of teachers (Brown & Mbati, 2015; Oblinger, Oblinger & Lippincott, 2005; Weller, 2007) and topic of much controversy. According to Oblinger, Oblinger & Lippincott (2005), the transformation is happening to the classroom learning ground (Nunan & Choi, 2010) since

> these changes catalyzed by technology make it clear that the term classroom, at least in its traditional sense, can no longer encompass where learning takes place. Equally obvious is that the space in which learning takes place is no longer just physical; it is virtual as well (Oblinger, Oblinger & Lippincott, 2005, p. 12)

We also detected on the literature that VLEs are sometimes mistakenly understood as a Learning Management System – LMS as Martindale & Dowdy (2010) consider, a digital platform where institutions provide services for content access and administrative operations to teachers, students and management personnel. The conceptualization for virtual learning environments that is encompassed on this

investigative study and mindset is focused on how mobile "digital environment affects language learners and language learning" (Evans, 2009, p. 14) since they were designed to one purpose – L2 acquisition. Through a personal view, we reckon that the management of operations and data organizing courses, grades, address files, curriculum, rate of approvals per grade and other information available for the proper administration of an institution should be categorized in a different scope – school management systems.

A MLE, a Mobile Learning Environment (Finardi & Porcino, 2014; Godwin-Jones, 2011; Kukulska-Hulme, 2005) is an enhancer (Gillespie, Boulton, Hramiak, & Williamson, 2007) of knowledge development; it is a digital platform "designed for supporting and improving the individual study process" (Van Raaij & Schepers, 2008) and they can also represent "espaços virtuais ideais para que os alunos possam se reunir, compartilhar, colaborar e aprender juntos" (Paiva, 2010).

There are no limits of time and space, MLEs can provide asynchronous or synchronous communication channels (Freitas, 2004; Picciano, 2002; Rahamata et al., 2011) between student and instructor and enable "pupils to create and store digital work which can be refined as a project progress" (Gillespie et al, 2007). In the study presented, we analyzed how students at UNIT and UNL autonomously adopted and implemented to their "daily digital routines" (Dahlstrom, Brooks & Bichsel, 2014) the use of SLA apps and the rates of adoption and rejection reveal that a factor "critical to successful implementation of VLEs is student acceptance of the system" (Martins & Kellermanns, 2004). After thirteen years, Martins and Kellermanns (2004) ideas still sound fresh.

On this pedagogical interaction with mobiles for SLA, most students consciously or not make use of Self-Regulated strategies (Campos, 2016; Kiliç-Çakmak, 2010; Zimmerman, Bonner, & Kovach, 1996) to understand what the activities are about and to flow through the application getting a grasp of its audio-visual functionalities (Brown & Mbati, 2015; Chen & Hsu, 2008) and L2 acquisition possibilities. Some of the concepts that orient this enhancement of educational processes through ICT encompass the principles of Self-Regulated Learning – SRL (Campos, 2016; Carneiro, Lefrere, Steffens & Underwood, 2011; Kiliç-Çakmak, 2010; Pintrich, 2004; Zimmerman, Bonner, & Kovach, 1996) where students are in charge of the content choices.

Controlling the rhythm for a task execution or when learning happens through self-regulatory skills, immediate and meaningful feedback is provided by digital artifacts to these very same students. Through the apps, this 'new' language learning experience differs from usual systems of teacher – student classroom routine and consequently brings doubts to traditional conceptions of SLA. An individual aspect of the learner works for a "pivotal agent in defining goals and strategies" (Carneiro et al, 2011) to the learning experience which contains elements of uncertainty, what is in consonance to contemporary education in recent times.

Another definite argument brought to light by the pundits is that there are different conceptions for self-regulated learning (Carneiro et al, 2011) and several perspectives. Some investigations focus on the process rather than the individual; others look through the neurological components or behavioral standards that trigger the regulation. The study here presented entailed us to adopt concepts involving strategic levels (Ling, 2004; Weller, 2011; Zimmerman, 2008) of the self-regulation adopted by the participants while using the apps.

Most authors agree on the existence of basically three stages: Goal Setting as stage 1, Monitoring Process and Strategies for stage 2 and Self-Evaluation – stage 3 (Carneiro et al, 2011). Previous works such as Knowles (2005) proposed a similar division decades ago, establishing the stages as: Take initiative, Diagnose needs, Learning goals, Identify material, Evaluate outcomes. Winne & Hadwin (1998) establish the (same) steps as Define task, Goal setting and planning, Enact strategies, Metacognitive studying. Most of them demonstrates a resemblance to Zimmerman, Bonner, & Kovach's (1996) perceptions composed of Self-evaluation, Goal setting and planning, Strategy implementation and finally, Outcome monitoring.

Bringing all these nuances in nomenclatures and slight differences in tags to a macro-perspective the stages could be divided into: Forethought, Volitional Control and Self-Reflection (Pintrich, 2004; Zimmerman, Bonner, & Kovach, 1996). With the apps as a learning tool for language acquisition, we are under a metacognitive perspective for the Learning activity; the steering wheels are changing hands as EFL/ESL teachers may have to aim for a new 'redefinition' of what represents their work from now on. As we have been through the concepts of Downes (2012), Siemens (2006), Lobato (2013),

Anderson (2008), Pollara (2011), Costa (2013) for Connectivism acting like a common ground in future education, mobile learning and L2 apps have to find a path as well.

In particular, we comprehended that the acquisition of any knowledge, be it linguistically or not, circles around steps that achieve learning; having those nomenclatures only as slight semantic variations of the same idea. There is an academic agreement that learning has at stake a high number of "self-regulatory processes" (Castro, 2007; Schunk, 2012). Also, the more ICT is accepted in pedagogical practices, the more it becomes the rule and we may see a day when custom schooling is tailored for individual needs. We are taking students from 'know what', when the information only was delivered by the Teacher to a new paradigm where students, graduates and future employees are required to 'know how', 'how to learn' and 'how to relate to a changing world' (Kiliç-Çakmak, 2010). Self-regulated strategies have strong connections with Self-efficacy in Education and a few recent researches have dealt with the intrinsic aspects about the need of a redesign in knowledge acquisition mechanisms and foster "critical thinking" (Kuhn, 2011; Schunk, 2012) in graduates.

As the level of complexity increases concerning the linguistic content acquired, the more self-regulated students will have to master the three dimensions of educational activities: knowledge, skills and attitude (Pinto, 2010; Zimmerman, 2008). It is also interesting to ponder that motivational learning strategies (Kiliç-Çakmak, 2010; Sha, Looi, Chen & Zhang, 2012) work as oxygen to the increase of behavior procedures that lead to L2 acquisition. Institutions have always been doomed to accept responsibilities for the unsuccessful aspects in education due to a much-discussed 'distance from reality' curriculum (Wilks, 2005). Academic papers about the epistemology of the field reveal that "schools offer knowledge to their students which is abstracted from concrete situations and is therefore not situated" (Collins, Brown & Newman, 1989) in the current reality of learners. If we take this idea and analyse second language acquisition into contemporary times, it makes sense.

Historically, SRL has been through some different levels of analysis where the performance of learners was observed in its processes (Kim, Wang, Ahn & Bong, 2015; Pintrich, 2004; Zimmerman, Bonner, & Kovach, 1996) however, after the acceptance of mobile devices and connectivity in modern life, and gradually in education, informality on learning situations have to be put under perspective. If academic investigations work

to narrow the gap between formal and informal learning environments (Bo-Kristensen, Ankerstjerne, Neutzsky-Wulff & Schelde, 2009; Campos, 2008; Dabbagh & Kitsantas, 2012; Kukulska-Hulme, 2012) and to the acceptance of different forms, we will not question these methods in three, four generations. Many truths of Pedagogy and Education are under scrutiny due to ICT, informality is not new and it has been an issue of second language acquisition studies since the 70's.

In that decade, Krashen (1976) pointed to the necessity of more attention to the duality of instances mentioning that "two sorts of linguistic environments are contrasted; artificial, or formal environments, found for the most part in the classroom, and natural, or informal environments" (Krashen, 1976, p.157). The participants of this study were submitted to similar experiences with the SLA apps (receive knowledge – become familiar – perceive usefulness – adopt/reject – use/not use) both in and out of formal classroom premises. If academia feels the need to reshape HEI patterns and procedures, we have to adapt to graduates' learning styles and

> not neglect the informal for the formal, or assume that Net Gen students somehow will figure out the virtual space on their own. We should connect what happens in the classroom with what happens in informal and virtual spaces (Oblinger, Oblinger & Lippincott, 2005, p.180).

3.4 Curriculum Development and English Language Learning: integrating Apps into practices

As a conclusion to this Chapter 3, we provide some contribution to the analysis of how curriculum developers (Ceia, 2003; de Almeida & da Silva, 2011; Lima & Maranhão, 2011; Slattery, 2006; Zhang, 2012) could deal with the plethora of opportunities brought by smartphones and tablets to learning, in special, to English language learning. We consider two main issues on this subchapter: the first one is how higher education institutions and English language courses may interpret a more learner-centred curriculum design (Martins, 2012; Silva et al., 2014; Wilks, 2005; Zhang, 2012) that integrates SLA apps as a complementary tool (Alda & Leffa, 2014; Moura & Carvalho, 2011; Hsu, 2013) for practice. The second point is how current syllabi and curricula are

demanding advanced digital literacy (Erstad, 2011; Loureiro & Rocha, 2012; Sampson et al., 2013) from professionals involved in L2 education every day.

This "postmodern era" (Blake, 2008; Slattery, 2006) has presented challenges for SLA curriculum developers that range from covering people's language learning needs to the transformed role of the teacher (Bax, 2003; Jurkovič, 2006). Given these observed trends of L2 learning, Ceia (2003) analyzed this issue more than a decade ago concerning the adjustment Portuguese universities had to execute for the fulfillment of Bologna principles. Institutions changed their orientation moving from a faculty-oriented system "to a more open system with wider choice (totally student-oriented), thereby signifying a greater intervention by students in the choice of their own educational path" (Ceia, 2003, p. 2).

The Portuguese author disagreed with this perspective and reinforced that language learning courses and curricula could be more advantageous to its participants if they were "inquiry-oriented", taking students to investigate topics through different perspectives as well as if they were more concerned about enhancing the learner reasoning areas, making them have decisions based on cognitive perspectives of the language or becoming "thinking-oriented" as Ceia (2003) stated. This way, language classes could foster "collaborative teacher-student relationships and high teacher efficacy and capacity for conceptual change" (Ceia, 2003, p. 3). For Nation & Macalister (2010), curriculum design totally focused on technology language learning may impoverish its primary objective of developing knowledge on students to be used in a "community language learning" situation; and emphasize linguistic aspects of individualization for the sake of a personal autonomy in L2 language.

Throughout the literature review, we perceived several discussions about a re-conceptualization of education provoked by ICT and it seems to be a paradigmatic and profound issue applied to general learning and, by association, to second language acquisition. Sharples, Taylor & Vavoula (2010) asserts that "cybernetic process of learning...can be seen as a challenge to formal schooling, to the autonomy of the classroom and to the curriculum as the means to impart the knowledge and skills needed for adulthood" (p. 8).

Having a different perception to the arguments above and bringing light to some positive aspects of the learner-centred curriculum (Kukulska-Hulme, 2010; Martins,

2012; Silva et al., 2014; Valk, Rashid & Elder, 2010; Zhang, 2012), we mention that when institutions aim for an adequacy to current days they demonstrate connection to the world around where a "quest for digital knowledge" (Ortega & Bagnato, 2015; Thomas, 2011) is practically imposed on most of us. We are pushed to the use of our mobile phones and to join the latest communication/social media application (Facebook, Messenger, SMS, Whatsapp, Skype, Instagram and Twitter), be it in a personal or professional circle. The great majority of the app-users did not take a course on "how to send a whatsapp message", even though tutorials are available online. They interacted with the app for some time, learned its features and after two or three mishaps, acquire the knowledge to use it appropriately.

Take that expertise to the classroom and to the learning arena and it is natural to see mobile learning having the end-user as a curriculum developer (Anderson & Shattuck, 2011; Ramos & Espadeiro, 2014) to his/her content. This behavior might be a result of several hours of daily interaction with smartphones and digital technologies. Promotion of autonomy has never been characteristic to educational institutions which see their role in society threatened by the sheer dominance of digital technologies. An independent, self-directing and individualistic enhancement of knowledge puts under scrutiny some of the 'long-standing' virtues of schools and universities: a place to attend when someone needs to acquire formal or academic knowledge. For that reason, institutions are taking time but are slowly remodeling themselves to accept and include mobile devices (Ballard, 2007; Ling, 2004) and internet technologies to curricula and to students' daily practices.

According to Kukulska-Hulme (2010), a curriculum centered on learners' needs may "enable them to access fresh content and local information on the move, and support them as creators and producers of content" (p. 12). For Freitas (2004) "é necessário fazer um esforço de renovação do currículo no sentido de transitar da era industrial para a da sociedade da informação" (p. 25). Bastos and Ramos (2015) believe that curricula focused on students help them on developing a proper significance to contents, and proper can be understood as having individual relevance as they develop "um pensamento profundo e crítico, a aceder a informação e a interpretá-la, a refletir, organizar e representar o que sabem" (p. 594). Just to bring the discussion to current

days, Blake (2008, p. xiv) wisely adverts that for those teachers working in the CALL or MALL field, “becoming outdated is a constant worry”.

Before we dedicate to the second issue on how ICT-based curriculum development and syllabi create unprecedented demands on second language teachers due to constant digital literacy updates, we found some authors dwelling upon the social aspect related to the declining status of teachers in society (da Moita Lopes, 2008; Graham and Phelps, 2003; Maguire, 2010), and the harmful consequences to everyone when the most brilliant minds are not attracted to the profession of teaching (Graham and Phelps, 2003). Moreover, becoming a high-end ESL/EFL teacher in the XXI century involves issues beyond linguistic knowledge inasmuch funds to supply an international living experience gathering cultural awareness (Blake, 2008) in an English-speaking country.

Keeping up-to-date to the latest on English language learning websites and mobile applications may become another burden to the already hectic life of L2 teachers these days. Researching takes time, it is a thorough, cognitive task and after finding relevant ICT resources online (mobile or PC-based) teachers have to ponder how to include those “thoughtful practice into potential learning situations” (Graham and Phelps, 2003). About mobile apps for SLA or MALL, the speed of new applications popping up every day is hard to be followed closely.

Another question is that adopting or incorporating technological innovations into higher education curriculum (Ceia, 2013; Kumar, 2005; Lucena, 2016; Sousa & Fino, 2007), involves possible shortcomings resulting from unfamiliar instructional procedures and technological constraints. When this digital literacy (Leu, Kinzer, Coiro, & Cammack, 2004) is imposed as requirements to professionals but the technology infrastructure (Hubbard & Levy, 2006; Martinho, 2014; Zhang, 2012) of the institution and the motivation from supervisors are not up to par, teachers come to the conclusion that “opposition to change and innovation in schools is pervasive, and many curriculum leaders abandon their efforts to reconceptualize teaching and learning for lack of support” (Slattery, 2006, p.13).

As a last stroke, among the characteristics to be taken into account when including some sort of digital literacy for English acquisition, it has to be assessed the learners’ age and worldview, L2 knowledge involved, learning purposes, time availability, teachers and students’ ICT knowledge and access, ownership of the device to be used

and others. Slattery (2006) dealt about the existence of different approaches to knowledge acquisition in postmodern educational times and stated that we have to "reconceptualize school curriculum in order to recover the wisdom that is lost in information transmission" (Slattery, 2006, p.93).

4 Second Language Acquisition into Mobile Assisted Language Learning: criteria for the applications.

4.1 Applied Linguistics when focused on Second Language Acquisition

To get the full grasp of an investigation that aims at studying second language acquisition understood as "the phenomena involved when a person acquires a second language" (Jordan, 2004, p.5), we must dwell over a few concepts of Applied Linguistics (Beatty, 2010; Corder, 1973; Leffa, 2006; Widdowson, 1989) comprehend that language educators operate respecting explicit theories of language learning (Cavalari, 2011; Costa, 2013; Sharples, 2000). Pondering about the perceptions of language throughout this work, we see eye to eye with the definition of Applied Linguistics from Pennycook (2001) as "an area of work that deals with language use in professional settings, translation, speech pathology, literacy and language education: and it is not merely the applications of linguistic knowledge to such settings but is a semiautonomous and interdisciplinary domain of work (p.2)". Applied Linguistics as a field was initially used to refer to a "scientific approach" of academic discussions happening in the USA and UK. These scientific discussions analyzed and assessed foreign languages teaching (Brown, 2000; Richards & Schmidt, 2013), in special, teaching English for non-native speakers (Hoy, 2011, Zhang, 2012).

Although developed since the 1950's, Applied Linguistics studies over the last two decades have witnessed a reduction in the search for the "best method" in language teaching and this demonstrated maturity in the scientific arena (Nation & Macalister, 2010). For these two authors, "there is no one right answer to how languages should be taught or learnt" (p.200). On this millennium, Applied Linguistics has tried to find the right choice the typify or 'tag' ICT when involved in language learning considering technology as "the conduit, the tutor, the tool, the community" (Evans, 2009). We personally see the technology developed to the SLA apps of this investigation as communicative and grammatical tools and as a linguistically-oriented community

device. In some years, we will not mention technology as a differential because “while computers in foreign-language learning have not yet reached the level of invisibility or ‘givenness’ that textbooks have achieved, it is generally accepted that computers are becoming normalised” (Blyth, 2009, p. 175).

Applied Linguistics for SLA (Freeman, 1989; Van Patten & Williams, 2014) has helped to promote meticulous investigations aimed at comprehending new methods of learning a L2 and if we consider the economic, communicative and cultural importance of the English language, it is possible to understand why most of researches deal with the native idiom spoken in the United Kingdom colonies as the object of study. The complexity of the modern world and a ubiquitous influx of technologies have influenced most scientific areas and it is not different to language teaching. As ICT transforms academic scenario and aggregates complexity to SLA, we tend to agree with Finardi and Porcino (2014) that “na área de linguística aplicada e do ensino de línguas adicionais em particular, alguns estudos têm advogado em defesa de uma prática de ensino de línguas sob a perspectiva da teoria da complexidade (Finardi & Porcino, 2014, p. 261)”.

This Theory of Complexity (Cilliers, 2000) is less related to organizational issues and more understood under the principles of Gardner (1988) that had a view of learning as some kind of complexity related to the acquisition of a second language and its nuances for L2 acquisition. Learning a language is an activity that happens in itself through a rather complex way (Alsup, 2006). With the constant need for updating strategies and procedures in SLA, the entrance of ICT in the lives of English Language Learners (ELL) transforms and creates new perspectives for English Language Education (ELE). We have extensively explained how this technological innovation may happen through the acceptance and adoption of the apps; however, it is interesting to observe it through some linguistics’ point of view. According to Waters (2009), Innovation “has become a defining characteristic of English language education (ELE) over the last twenty years or so (p.481)”. Some synonyms of Innovation in the language acquisition literature may bring words as ‘change’ (Murray, Gao & Lamb, 2011), ‘modernização’ (Martinho, 2014), cutting edge (Green & Hannon, 2007; Kenning, 2007; Hoy, 2011) however, the real scope of the transformations L2 acquisition will be submitted in the next 10 years looks appalling when it concerns technologies in SLA applications.

Dealing with the conceptual framework of language learning (Kukulska-Hulme, 2012, Sharples, 2000), the participants were submitted to our second language acquisition investigation based on one of Krashen's (1981, 2004) hypothesis entitled Input Hypothesis and delineated by the formula i+1; where the author considers i – the background knowledge of the language already retained by the leaner and then +1, the new knowledge acquired by the very learner through a linguistic encounter. Here, this linguistic encounter was executed or performed through the app. Krashen's Hypothesis (1981, 2004) is based on the profusion of Intake by the language learner, as much as possible. Krashen (1976, 1981) also delineated learning as a conscious activity and acquisition as a subconscious activity (Blake, 2008), suggesting the subconscious part to be far more important than the other. For the author, language acquisition "comes from, that subset of linguistic input that helps the acquirer acquire language (...) This being a very difficult task, one could also say that the major challenge facing the field of applied linguistics is to create materials and contexts that provide intake" (Krashen, 1981, p. 101).

This is exactly the proposal we devised in our formulated UTAUT+M with SLA apps working as Intake materials and augmenting contact with the target language (Brown, 2001; Davies, 1999; Little, 2007) by the end-user. For Krashen (1981) and his Input Hypothesis, learning happens when the apprentice encounters a level of complexity that is just a little over his/her capacity (+1). This motivates the people learning a second language to try to linguistically understand what was said or written, the gist of it (Brown, 2001; Cheon et al, 2011). For these authors, this is exactly the moment acquisition happens. Krashen's theory assumes that the learner will acquire language better if provided with the opportunities to receive constant Inputs of the idiom. According to him, when these requirements are met, and where there is a great deal of input of this nature, it may be the case that i +1 will "naturally" be covered and reviewed many times over, and progress in language acquisition will result. (Krashen, 1981, p. 104)

For Krashen (1981), this input has to provide the right amount of unfamiliarity or "just beyond the acquirer's current level" (p. 106) in order to be 'understood' yet unfamiliar. The semantical and linguistic comprehension of this new item starts making sense as vocabulary when it is filtered and assembled to the linguistic knowledge

retained by the learner. The same way it worked for other methodologies pre-ICT, when this linguistic Input is acquired, it becomes knowledge and part of the familiar vocabulary of the user (Chen & Chung, 2008; Kukulska-Hulme, 2012; Sharples, 2000) and later on, this Input is uttered in an Output. At this moment, we have the fulfillment of the acquisition process. For Krashen (1981), if this Input is comprehensible and fits into a linguistic background "this allows the input to strike more deeply and thus be more effective intake for acquisition". (p.133).

Krashen's concept examined learners working to decipher the unfamiliar linguistic item on the L2 experience, exactly what happened to our participants who also made use of Vygotsky's (1986) Zone of Proximal Development for learning on the experience. ZPD is a concept present in several linguistic researches and publications (Brown, 2000; Evans, 2009; Kenning, 2007; Little, 2007; Schunk, 2012) summarized as "the gap between what a learner is currently able to do and what he/she could potentially do with assistance from more advanced peers" (Vygotsky, 1986, p. 186). The advanced peer in our case is the ontology presented in Duolingo, Babbel, Busuu, British Council and Speak English Daily and to other apps for English acquisition. On Figure 4-1, we see how the Krashen's concept works, in this case, using a smartphone to fulfill the role of the Language Acquisition Device (Chomsky, 1967) or LAD in this Input Hypothesis Model.

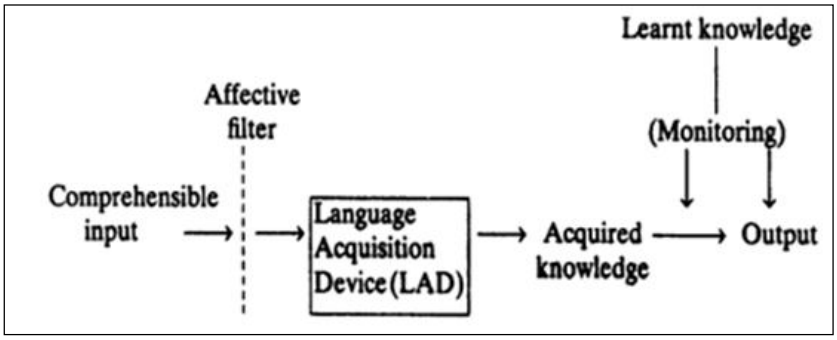


Figure 4-1: The Input Hypothesis Model for Second Language Acquisition. (Source: Krashen, 1981)

Although recognized as one of the most important concepts in Second Language Acquisition, criticism to Krashen's (1981) idea comes from the fact that he "emphasizes

acquisition instead of learning" (Zafar, 2011) and there is also some disagreement to the fact that "learners are seen more like machines than as cognizant beings" (van Vlack, 2010). Barry McLaughlin (1990), a respected psychologist from the University of California in Santa Cruz (USA), criticized Krashen's ideas for the "fuzzy use of such crucial terms as unconscious and conscious" (p. 614) which are complex for psychologists to define and McLaughlin (1990) consider them too vague to be used in linguistical contexts. His words are:

> My own bias, however, is to avoid use of the terms conscious and unconscious in second language theory. We believe that these terms are too laden with surplus meaning and too difficult to define empirically to be useful theoretically. Hence my critique of Krashen's distinction between learning and acquisition—a distinction that assumes that it is possible to differentiate what is conscious from what is unconscious. (McLaughlin, 1990, p. 627)

Nevertheless, Krashen (2004) is still being used extensively in SLA research and academic field respects his literature as more than 10.200 citations can be found in Google Scholar and Web of Knowledge combined as in August 2016. Composing the SLA app language acquisition experience, the interactions on the applications were performed by the participants through a series of conscious self-regulated learning strategies (Beishuizen & Stefens, 2011; Zimmerman, 2008) that certainly enhanced their English language acquisition (Krashen, 1981; Jordan, 2004; Chinnery, 2006). As the main focus of this investigative work deals on adoption (Ferreira et al., 2012; Rogers, 1983; Sahin, 2006) of the Apps, the deep questions concerning elements that alter L2 acquisition due to the constraints of the Input Hypothesis may be destined to other investigation.

4.2 Technology Assisted Language Learning: from the phonograph to MALL

Technologies have been intimately related to language learning for more than a century with first registers of their use to be around 1902. In fact, this pioneering experience consisted of a package designed to learn languages where textbooks were

shipped together with some cylinders containing audios (an invention by Thomas Edison) to be played on a phonograph (Chinnery, 2006; Kenning, 2007; Paiva, 2010). This created the possibility of listening to the target language and amplified L2 learning resources (Kukulska-Hulme, 2010; Sampson, Isaias, Ifenthaler, & Spector, 2013; Siemens, 2005). As a logical evolution from the phonograph, the next technology used in teaching foreign languages was the Long Play (LP) that improved even further aspects concerning the Orality (Evans, 2009; Kenning, 2007) in SLA. Before this, foreign language learning was mostly focused on reading and writing abilities and the oral skills of the language (Cucchiarini, Bodnar, de Vries, van Hout, & Strik, 2014; Martins, 2012; Zhang, 2012) were seen as adjacent and placed on a less important category.

The next tech-related change on this chronology came with the cassette tape and its possibility of recording audios. Cassette tapes (Chapelle & Douglas, 2005; Godwin-Jones, 2011; Kenning, 2007) brought to students conditions to listening to their own recorded pronunciation after oral activities with audios from native speakers. It was a transformation that demanded an overhaul in procedures to most of the ELE institutions through the demand of laboratories (Chinnery, 2006; Lyster, Saito & Sato, 2013; Paiva, 2010) specially built for that. Never mind the cost for these labs, the methodology produced poor feedback (Bauerlein, 2011; Hargreaves, 2003) as teachers could not correct all the statements recorded and learners ended up having a mistake recorded in their tapes and never corrected. Another issue was that communicative approach (Bax, 2003; Mitchell, 1994; Underwood, 1984) of the activities could not be largely executed due to the individuality of the listening/recording experience in laboratory booths.

Radio programs (Evans, 2009; Kenning, 2007; Paiva, 2010; Tonoian, 2014) designed and produced to be similar to a short English class were broadcasted by global radios such as BBC and Voice of America which incremented the possibilities of learning English through audio (Chinnery, 2006; Teles, 2013). However, they did not have highly effective results as listening to the radio (Agulló & Vallejo, 2015; Knowles, 2005) was hardly seen as a 'learning activity'. When television enters language learning applications (Campos, 2008; Chinnery, 2006; Oliveira, 2004; Stockwell, 2010), video and audio start working for augmenting the quality of the linguistic input and

Audiovisual methodology was then created (Kenning, 2010; Little, 2007; Pilar, Jorge & Cristina, 2013; Teles, 2013).

During the 60's and 70's audiovisual methods reigned in classrooms around the world with a blend of activities on textbooks and audiovisual inputs projected on a screen or on the wall. Some years later, cassette tapes were replaced by CD's and VHS videotapes were then replaced by DVD's; pedagogical procedures were not transformed so much due to this 'hardware' evolution, though. The next technology in analysis has affected EFL, ESL classes as a whole due to the unprecedented breaking in paradigms and the amount of possibilities brought by it. Computers and later the internet totally reinvented foreign languages learning and our contribution to the literature analysis is developed on the coming paragraphs.

CALL – Computer Assisted Language Learning (Jarvis & Krashen, 2014; Marçalo, Fonseca & Silva, 2010; Paiva, 2010; Warschauer, 1998; Zhang, 2012;) is a field of study developed in the 1980s, linked to Linguistics and "filled with areas that are unknown and in need of exploration" (Beatty, 2010). Although relatively new, CALL articulates "multidisciplinary perspectives" (Beatty, 2010, Kukulska-Hulme, 2012) for linguistic skills as in listening, reading, speaking and writing associating ICT knowledge in using computers for linguistic purposes.

On this constant need for updating teachers' skills in order to be in synch to the "App Generation" (Gardner & Davis, 2013), "the division between teachers and researchers has narrowed" (Beatty, 2010, p. 7). Language laboratories that were used specifically for listening activities (Chinnery, 2006; Mackey & Gass, 2012; Paiva, 2010; Traxler, Barcena & Laborda, 2015) are now being used for "teachers using CALL activities based on email…and even mobile telephones to supplement student learning" (Beatty, 2010, p. 8). Even though this reality has changed over the last five years, there were not many studies concerning the evolution of Computer Assisted Language Learning. As Bax (2003) stated in the beginning of the millennium, "It is remarkable, in fact, that there exists no in-depth analysis of the history of CALL" (p. 14). That was in 2003, and in more recently times, Golonka et al. (2014) presented a deeper assessment of the research area in CALL and concluded that most works in the field brings:

> poor description of the research design; poor choice of variables to be investigated; lack of relevant data about participants; studies based on untrained users of the technology; a nearly exclusive focus on Western European languages, especially English; and an overall lack of systematicity in investigating key factors (Golonka et al., 2014, p. 71)

Following the historical aspects of CALL and paying special attention to the stages of development for what the field has been through, we have to establish that Computer Assisted Language Learning all started with Behaviouristic CALL (Bax, 2003; Marçalo, Fonseca & Silva, 2010; Warschauer & Healey, 1998), later developing into Communicative CALL, and then it evolved to Integrative CALL. "Each stage corresponds to a certain level of technology as well as a certain pedagogical approach" (Warschauer & Healey, 1998, p. 57).

Behaviouristic CALL was implemented in the late 1960s and 1970s mostly in the USA and it was a language learning perspective based on grammatical rules, the structural part of the language, translation texts and repetitive drill-and-practice L2 activities performed in the first computer-assisted learning system named PLATO; Programmed Logic for Automated Teaching Operations that was developed in 1960 at the University of Illinois in Urbana-Champaign, USA. According to Evans (2009), on PLATO "there was a 'strong emphasis on grammar' with the aim of helping 'students gain accuracy in their language usage'" (p.19). Linguistic accuracy (Hoy, 2011; Polio, 1997), especially concerning grammatical elements, was prized highly and seen as the main issue on learning. The computer was as a "mechanical tutor which never grew tired or judgmental and allowed students to work at an individual pace" (Warschauer & Healey, 1998, p. 57). Although designed for a mainframe, it eventually moved to the reality of its time – the expansion of PC use.

The next stage from 1970s to 1980s was Communicative CALL (Park & Slater, 2013; Warschauer & Healey, 1998) started getting popular at the same time behaviouristic approach declined in use and it was based on a different perception of L2 acquisition. With the popularization of PCs, more individual work was getting done by the learners and the target use of the language was much more important than the form of the language. It was a major change when linguistic accuracy (Hoy, 2011; Polio, 1997) was redefined to communicating and certainly "corresponded to cognitive theories

which stressed that learning was a process of discovery, expression, and development" (Warschauer & Healey, 1998, p.57). Activities in communicative CALL ranged from text reconstruction for adequate meanings up to dialogue simulations (Costa, 2013; Zhang, 2012) of communicative competence (Kenning, 2007). Criticism came to the fact that the computer in Communicative CALL was developing peripheral elements of the language like IPA alphabet teaching and gap-filling activities but not real conversational aspects more focused on sociolinguistic competences (Jordan, 2004; Kukulska-Hulme, 2012).

Even though these activities mentioned enhanced interesting characteristics of the idiom for a better comprehension and consequently a better acquisition, for Warschauer & Healey (1998) there was a lack of "emphasis on language use in authentic social contexts", that socio-linguistic element defined by the environment and situation where the language is being used at. More recent papers (Bax, 2003; Martins & Moreira, 2012) opposed to this perception of Warschauer & Healey from 1998 understanding that teachers always had a 'social context' in mind when teaching languages (even with no ICT involved) and that the term "Integrative" (Evans, 2009; Labbas & El Shaban, 2013) sometimes does not fully represent the context of computers in L2 learning. In fact, the last five years have shown that most scientific assumptions of the CALL field could be reviewed from time to time while definitions vary and evolution now moves towards mobile phones.

We would not be wrong if we say these two first stages of CALL, Behaviouristic and Communicative, were necessary to the conception of the next stage named Integrative CALL in a "perspective which seeks both to integrate various skills (e.g., listening, speaking, reading, and writing) and also incorporate technology more fully into the language learning process" (Warschauer & Healey, 1998, p.58). Some criticism is voiced to the fact that integrative CALL did not state exactly what constitutes "material de qualidade, como tais materiais podem ser avaliados e sobre como exatamente a tecnologia deve ser integrada em um curso" (Martins & Moreira, 2012, p. 253). Another criticism voiced on literature comes from the point there are not enough discussions solving that "computer literacy among both teachers and students can hardly be ignored" (Beatty, 2010, p. 16).

Nevertheless, ICT use in L2 acquisition becomes a common procedure around the 1990s and this was academically termed as “Normalization” (Bax, 2003; Chambers & Bax, 2006). In CALL studies, Normalization is a concept devised by Stephen Bax (2003) that seems to be “relevant to any kind of technological innovation and refers to the stage when the technology becomes invisible, embedded in everyday practice and hence ‘normalized’” (Bax, 2003, p. 23). The concept provides many assets to language teaching when considers CALL itself as one more innovation to be taken into account in language education and not that one panacea (Hoy, 2011; Oblinger, Oblinger & Lippincott, 2005) authors have been debating about. Normalization is also seen as a way to integrate academic discussions on innovation, characterized by the work of Rogers (1983) to linguistic analyses (Bax, 2003; Chambers & Bax, 2006).

Since academic discussions on whether technology should enter pedagogical instances is already outdated and ICT benefits in education have been widely published (Chinnery, 2006; Bartholo, Amaral & Cagnin, 2009; Liu, Navarrete, Maradiegue & Wivagg, 2014), what matters to researchers in the current arena is the development of methodologies to generalize normalization, in special to our case here, aim for normalization in MALL involving Brazilian and Portuguese higher education graduates. The core of the analyses over normalization nowadays must, according to Chambers & Bax (2006) consider some aspects that “successful educational reform programs tend to emphasize human and social aspects rather than issues related to equipment” (Warschauer, 2003, p. 466).

What the author means is that we have to avoid the technocentric (Papert, 1990; Traxler, 2009) view of ICT in learning and fully understand how ICT, computers, mobiles and digital connection factors really affect (language) learning or knowledge acquisition emphasizing the sociological aspect of it. Bringing the issue to a parallel field of our field of study, it would be wise to see investigative works uncovering how people lives could change when you understand a second language or even how effective global communication can happen when one has reasonable interconnectivity and L2 knowledge. According to the author,

> not only do we need to consider each relevant factor, but that we also need a better understanding of how exactly all of these factors interact and operate in real pedagogical contexts, so as to throw light on the ways in which different

> aspects, technological, administrative, social and others, interact to promote or impede the normalization of CALL. This implies a program of appropriate research. (Chambers & Bax, 2006, p. 467)

The full scope of Normalization (Bax, 2003; Martins, 2012; Paiva, 2010) is regulated by the awareness from Teachers, Institutions and Students to the "7 Stages of Normalization" which Bax (2003) casted as fundamental to a new technology become "normalized" into many aspects of our lives as well as its practice inside educational institutions. Drawing on Rogers (1983) and his Diffusion of Innovations, Bax (2003) summed up the Stages towards normalization as:

1- Early Adopters – the one who resemble Rogers (1983) definition and as avid individuals for new technologies, adopt it for the curious side of it.

2 – Ignorance/Skepticism – people are skeptical and ignore the technology suggested.

3 – Try Once – people try and reject as "Relative Advantage" (Ahmad, 2014; Rogers, 1983; Sahin, 2006) is not perceived.

4 – Try Again – an opinion from someone who believe the new technology works creates a tendency for the subject to try once more.

5 – Fear/Awe – a cyclical emotional effect generated from the experiences with the new technology.

6 – Normalizing – new technology becomes "normal" gradually.

7 – Normalization – technology becomes almost invisible since it gets integrated into routine.

Logically, these stages happen in different ways for different people inasmuch to different institutions and respond to motivators (Oblinger, Oblinger & Lippincott, 2005; Sahin, 2006) in a very proper and individualized way. Adoption of SLA apps, this normalization in an autonomous perspective is what we pursued in this investigative work and to situate this 'adoption' among these seven stages it would have to be between stages 4 and 5. At the experiment presented, we did not verify the levels of normalization through surveys in order to avoid misinterpretations from participants.

On the search for this normalization, Chambers and Bax (2006) delineate some issues that are mandatory for it take place, in a satisfactory level and considering of these underlying elements demonstrate that CALL attempts and, by association MALL ones, might be successful if they go as planned here. As the author proposed, Issue #1 refers to "CALL facilities will ideally not be separated from 'normal' teaching space", creating on students an atmosphere of daily routine to the presence and use of ICT in educational purposes (Sampson et al., 2013).

Issue #2 points to the fact that "the classroom will ideally be organized so as to allow for an easy move from CALL activities to non-CALL activities" in a procedure that Chambers and Bax (2006) do not delineate clearly, although some authors mention the lack of time in teachers' reality (Issue #3) as a hindering factor. It is interesting to ponder that moving from CALL to non-CALL requires mastery from the teachers as not to permit "classroom dynamics" (Hubbard & Levy, 2006) to go downwards.

Issue #4 is one of the most appropriate for discussions because it states that normalization occurs if teachers as well as the management of the institution demonstrate "knowledge of and ability with computers to feel confident in using them". As ICT evolution has a reasonable speed, different methods and platforms are created daily, keeping up with the latest trends in the field requires research and valuable time, not to mention some "geek" mentality (Bauerlein, 2011; Thomas, 2011) from the instructors.

Issue #5 is about integration as "the role of computers in language learning" whereas Issue #6 seems to be vague when it understands that positive result of CALL classrooms "depends on several interconnected factors, all of which may need to be considered". Integration to syllabus is the question on Issue #7, connected to another really relevant point on Issue #8 which suggests "teachers to tailor the CALL activities better to fit the existing Syllabus" (Chambers & Bax, 2003, p. 475).

The three remaining issues are more related to the management of execution processes towards Normalization, asserting to be more adequate a "collaborative mode rather than in 'top-down' expert-to-novice mode" as Issue #9. Support to technical problems and skills to deal with such failures is the #10 and finally as Issue #11, Institutions as a whole have to support "teachers towards fully normalizing technology in their teaching" (p. 476).

Observing the different levels of adherence to these issues and stages established by Chambers & Bax (2006) and Bax (2003) and comparing it to the reality of today's use of ICT inside classrooms and Institutions or more recently mobile technologies, one must agree that many of them are still "lagging behind" (Silva, Gomes & Marçalo, 2013). At last, predicting the mobile revolution that would come some years later, Bax (2003) foresaw a reality we today, in 2017, still do not see fulfilled in most of the classrooms and learning institutions. In the original words of the visionary author,

> CALL will reach this state when computers (probably very different in shape and size from their current manifestations) are used every day by language students and teachers as an integral part of every lesson, like a pen or a book. Teachers and students will use them without fear or inhibition, and equally without an exaggerated respect for what they can do. They will not be the center of any lesson, but they will play a part in almost all. They will be completely integrated into all other aspects of classroom life, alongside coursebooks, teachers and notepads. They will go almost unnoticed (Bax, 2003, p. 24).

Fourteen years ago, Bax (2003) had already observed interesting aspects and foresaw the first steps of MALL, the technology that represents the XXI century and the topic on the next section of this Chapter – mobile technology. As on the avant-garde of the analyses, he also predicted that most of the attempts successfully tried to make CALL normalized would have to be repeated to implement Mobile Assisted Language Learning into higher educational institutions and language schools.

4.3 Mobile Assisted Language Learning for English Language Education

Mobile Assisted Language Learning is a natural evolution of CALL and since mobile phones and touch screens took our lives by storm in the last decade (Al-Fahad, 2009; Fernandes et al., 2012; Kukulska-Hulme, 2009, 2012; Pellerin, 2014; Sharples, 2000; Traxler, 2013) we have to bear in mind that this "important delivery mechanism" (Traxler, 2013) changed the way and the places where languages can be learned and

used (Chinnery, 2006; Kukulska-Hulme, 2010). In fact, according to one of the pioneers in MALL, John Traxler (2013), MALL can "make language learning more authentic, efficient, relevant, and effective by recognizing and responding to universal mobile technologies" (p. 2).

The first use of MALL recorded comes from 1980s, more specifically in 1988, when "Twarog and Pereszlenyi-Pinter (1988) used telephones to provide distant language learners with feedback and assistance" (Chinnery, 2006, p. 10). The next experience came from the Hawaiian Islands where Brigham Young from the University of Hawaii delivered an English course via telephone and computers to Tonga (South Pacific) in 1996 (Green, Collier, & Evans, 2001). These first initiatives have to be bravely remembered because it was pioneering more than anything else and it does not resemble in anyway whatsoever, the SLA possibilities available nowadays to potential learners. From the 2000s on, as wireless technology rapidly changed the world, MALL became more popular with academic experiments happening in many universities. Pioneers are the works of University of Stanford Learning Lab in 2001 (Brown, 2001) which developed Spanish study programs with email and voice for mobile phones. On a next experiment, vocabulary information was broadcasted via SMS in the concept created by pioneers Thornton and Houser (2003, 2005) at University of Japan to teach English through 'discrete chunks' of linguistic information delivered to 'tiny screens' (Chinnery, 2006).

Patterns of delivery seemed to be the key factor to the program created for Italian learners in Australia (Levy & Kennedy, 2005) where they sent SMS containing idiomatic expressions, vocabulary and examples in the form of sentences "in a spaced and scheduled pattern of delivery, and requesting feedback in the form of quizzes and follow up questions" (Chinnery, 2006, p 10). Wisconsin-Madison and Duke University as well as UK's Open University also designed experiments to implement mobile learning language learning with their students.

In Brazil, one the first academic works to deal with the subject was Meirelles, Tarouco & Alves (2004) where the authors "search to relate cognitive styles and of learning with the functionalities of the mobile devices and of systems management of learning online" (Meirelles, Tarouco & Alves, 2004, p. 1). In 2005, Marçal, Andrade & Rios, published the paper "Aprendizagem utilizando dispositivos móveis com sistemas

de realidade virtual" where they research how virtual reality could be intertwined with mobile devices in learning. For that, they developed a prototype on the framework architecture designed to implement programs in mobile devices, with special focus on usability, portability and interactivity. Although publications of papers in journals and conferences about mobile learning start to happen in higher numbers, Bottentuit Junior, another pioneer on the topic declared in 2012 that

> no Brasil ainda são escassos os estudos voltados para a aprendizagem móvel, a maioria deles retratam o desenvolvimento de aplicativos para os dispositivos móveis. Já na Europa, os estudos se voltam mais para as estratégias de ensino para exploração dos diversos recursos que os aparelhos podem proporcionar a nível pedagógico. (Bottentuit Junior, 2012, p. 134)

In Portugal, the pioneering academic works for the field of study began around 2001 with the publication of "Jogos eletrónicos para aprendizagem curricular em língua materna e estrangeira" by Adelina Moura (2001) where she analyzed arcade games such as Wordshoot, Flashcards, Matching Pair, Manic Miner and CannonBall Fun and how these games could be used to learn vocabulary and grammar in Portuguese and French. The next relevant Portuguese publication about learning with mobile devices is "O Futuro do e-Learning" by Bernardo & Bielawsky (2003) where one can find tendencies and hints to the evolution of e-Learning inside companies as well as how content development should be executed.

As we discussed in the chapters before about m-Learning, the definite aspects that motivate L2 learning in mobiles are portability, ease of use and immediacy (Norbrook & Scott, 2003) as much as the "bite-sized format" (Chinnery, 2006; Hoy, 2011; Kukulska-Hulme & Traxler, 2005) of the activities. These seem appealing to students without enough time as we could verify on our results. The abundance of SLA mobile apps available (many free or costing a little payment) on the online stores of Apple, Android and Windows phones has placed MALL in the "forefront of developments in mobile learning" (Kukulska-Hulme, 2012, p. 2). When analyzing the past and future of MALL, Traxler (2013) asserts that today "we see a society where these technologies, now cheap, pervasive and simple, are transforming language, its social context, and the nature of learning" (p. 2). This learning is "individualized and learner-centered"

(Sharples, 2000), and is helping to diffuse the first paradigmatic change brought by apps: the transformation on the relationship time and place in learning since students are the "driving force behind selections of content and interactions that fit in with the patterns of their personal preferences, movements, and daily habits" (Kukulska-Hulme, 2012, p. 3).

Another issue worth mentioning given the observed literature is that L2 learning through a mobile device "can also be seen as a stepping stone towards more authentic communication, through having to respond quickly, "on the spot," without the usual supports available in the classroom" (Kukulska-Hulme, 2012, p. 3). This immediacy (Gikas & Grant, 2013; Ling, 2004) of feedback contributes in large amounts to the adoption and acceptance of applications by learners due to a high users' level of satisfaction (Bandura, 1995; Campos, 2016; Muller, 2013) to the responses given. One of the three factors through which mobile devices help language learning to present advantages is the paradigmatic relationship of the dimensions time and place (Carlão, 2009; Martinho, 2014; Schunk, 2012; Stockwell, 2010) completely reformulated.

According to Kukulska-Hulme (2012) the "widespread use of handheld technologies such as mobile phones, smart phones, and mp3 players for informal and work-related learning is challenging existing perceptions of appropriate time and place for study" (Kukulska-Hulme, 2012, p. 1). Learning happens in distinct moments of the day and in places that were architecturally designed for another specific reasons for example, a doctor's waiting room that becomes for some time, a learning space (Blake, 2008; Martinho, 2014; Martins, 2012; Sharples, Taylor & Vavoula, 2010) because of the use of mobile devices and apps. Another example can be the use of idle minutes people have while commuting to work in public transportation to acquire some elements of the language studied (Demouy & Kukulska-Hulme, 2010).

On Figure 4-2, we have the image published by Kukulska-Hulme (2012) containing issues that are suitable to MALL when time enters the analysis: availability, specificity, spontaneity among others. Including place on the formula, the author understands the level of energy involved and the nature of the social spaces as private or public (Kukulska-Hulme, 2009) to be a component to pay relative attention. Activity complements the idea presented and helps to define elements of this very activity with

the characteristics of receptivity, sociolinguistic aspects and difficulty level to the end-user/learner.

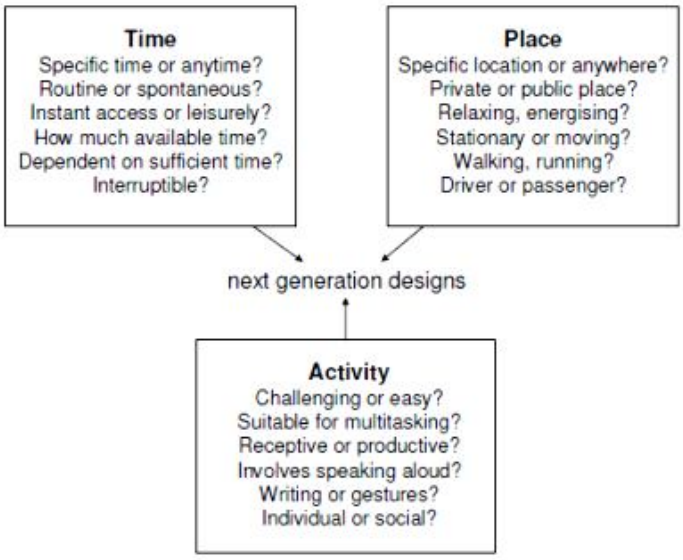


Figure 4-2: Language Learning defined by Time, Place and Activity. (Source: Kukulska-Hulme, 2012)

Portability and mobility can be grouped into the second factor pointed as an advantage of mobile devices entering the realm of language learning because it increased the number of hours with lessons available at the learners' hands. The portability of content and access to resources at learners' fingertips is truly enhanced by this feature and also creates a channel that promotes "tanto dentro quanto fora da sala de aula, (...) a comunicação imediata entre professores e alunos" (Bottentuit Jr, 2012, p. 141), what was rarely seen before in educational routines. With content being portable, it permits "learning to occur virtually anywhere, anytime, for however long the learner wishes to study" (Kenning, 2010, p. 192) and this is perceived for students, in special young ones, as a very interesting asset to MALL. Portability also allowed participants using the apps of this research to revisit "previously learned content knowledge, gain new knowledge and further develop problem-solving skills" (Liu, Navarrete, Maradiegue & Wivagg, 2014, p. 377) in linguistic activities.

Criticism to the notion of portability is raised by Traxler (2009) concerning the dangers of excessive technocentrism on pedagogical discussions. The author also alerts about the instability of definitions for 'portability' in such a fast-changing mobile industry. According to him, current debates are not grasping the real change that is taking place in learning holistically and "merely put mobile learning somewhere on e-Learning 's spectrum of portability – ending perhaps in ubiquitous, pervasive and wearable learning (Traxler, 2009, p.2). On the literature, there is a symbiotic relationship between the terms portability (Chinnery, 2006; Kukulska-Hulme, 2009; Teles, 2013; Meirelles, Tarouco & Alves, 2004) and mobility (Moura, 2011; Saccol & Reinhard, 2007; Santaella, 2009; Traxler, 2015) that aggregates sense to the notion of bite-sized learning (Agulló & Vallejo, 2015; Kwan et al., 2011; Traxler, 2009, 2013). However, there are aspects which are interesting to observe in limitations as Stockwell (2010) clarifies that

> computers became connected to the Internet and learners no longer needed to visit laboratories but could access materials from home, at times that were convenient to them. With the mobile phone, there is an even greater sense of freedom of time and place, but this freedom also can make it more difficult to make decisions about which times and places are the most suitable. (Stockwell, 2010, p. 107)

Among the disadvantages appointed by the literature as well as by our participants in the experiences of MALL were mentioned small screens (Ballard, 2007; Bartholo, Amaral & Cagnin, 2009; Godwin-Jones, 2011; Stockwell, 2010) which restrict long exercises due to lots of scrolling, low battery life (Fernandes et al, 2012; Kukulska-Hulme, 2005; Sampson et al., 2013; Traxler, 2009) and the constraints of it, the difficult of extensive writing activities because of small keypads (Martins, 2012; Stockwell, 2010; Zhang, 2012) and mostly for Brazilian participants, poor connectivity problems (Moura, 2011; Laguardia, Portela & Vasconcelos (2007); Traxler, 2009).

The third factor that has to be considered as an advantage for mobile learning in second language acquisition is the possibility of having Immediate Feedback (Campos & Freitas, 2015, Valk, Rashid & Elder, 2010) on activities executed on smartphones and mobile devices. This feature and its learning possibilities is discussed on the next

section 4.4, where we performed an analysis of the human-computer interface and other relevant criteria on the five applications used in this research.

4.4 Human-Computer Interface & Ergonomic Criteria for Second Language Acquisition applications: which criterion to choose

On this quest to a self-determined and volitional adoption of virtual learning environment applications (Mozzaquatro & Medina, 2008) by university graduates, it was relevant that the authors evaluated the human-computer interfaces of the apps focusing on their linguistic features (Campos & Freitas, 2016) available on their latest versions of August 2016. We looked for characteristics of the graphical user interfaces (GUI) (Cortez & Roy, 2012) that may raise awareness and lead to the adoption of a MLE by participants once they created effective language learning. Under this evaluation were the applications' human-computer interaction (Assila, Oliveira & Ezzedine, 2014; Bastien & Scapin, 2003) and their Ergonomic Criteria (Bastien & Scapin, 2003). The authors' concepts about how to assess VLEs include a few criteria but, in this empirical study; we are catering to two of them due to the appropriateness to our objectives.

The first criterion selected was Guidance (Bastien & Scapin, 1997; Cortez & Roy, 2012) which consists of "the means available to advise, orient, inform, instruct, and guide the users throughout their interactions with a computer (messages, alarms, labels, etc.), including lexical issues" (Bastien & Scapin, 1997). An app that presents good guidance through interesting and logical action steps potentially lead users to feel comfortable when interacting with them (Elliott, Hall & Meng, 2008), what guarantees new visits. This comfortableness range from recording the last step done by the user, reinitializing the app exactly at this point; up to providing non-ambiguous, uncluttered visual information that according to Bastien and Scapin (1997) "lead to better performances and fewer errors" (p.222). Guidance has a sub criterion labeled Immediate Feedback (Bastien & Scapin, 1997) that is responsible for the replies given by a system to its users.

This criterion really matters to our research because it is a relevant feature when interacting with information systems, in special, mobile systems (Sampson et al., 2013; Stockwell, 2010). There are two characteristics that are appreciated in immediate feedback – quality and rapidity. A fast, correct and meaningful feedback (Bastien & Scapin, 1997; Golonka et al., 2014; Kim et al., 2015) enhances confidence on users to the effectiveness of the application, "cumprindo assim sua função linguística pedagógica de forma eficiente e sem dubiedades semânticas" (Campos & Freitas, 2016). In mobile applications aimed at SLA, linguistic quality of answers is mandatory for successful learning to users and Bastien and Scapin (1997) alerts that "the absence of feedback or a delayed feedback can be disconcerting for the user. The users may suspect a system failure and may undertake actions that may be disruptive to the ongoing processes" (p. 223). Rejection and disenchantment to innovation in technology (Rogers, 1983; Sahin, 2006) have a strong co-relation to idea mentioned. On the next Figures 4-3 and 4-4, an example of Immediate Feedback is provided from the Babbel application to illustrate quality of the feedback and the linguistic relevance (Chomsky, 1955) as competence on a listening activity where the learner has to complete the sentence typing what he listened. The slight variation understood "tooked", assessed and delivered in the grammatically correct form – took. Some more verb tense information could be added but that would result in a cluttered HCI (Dix et al, 2004).

Figure 4-3 and Figure 4-4: Immediate Feedback from a Listening/Writing activity from Babbel. (Source: Babbel – 2016)

The second criterion selected from the ergonomic criteria of Bastien and Scapin (1997) used on assessing the apps was Workload that takes into account "all interface elements that play a role in the reduction of the users' perceptual or cognitive load, and in the increase of the dialogue efficiency" (p. 224). The authors reinforced that unnecessary information on the interface and a high amount of workload increases the probability of the end-user of committing mistakes. The sub criterion we submitted to our analysis was Information Density "a perceptual and cognitive point of view with regard to the whole set of information presented to the users" (Bastien & Scapin, 1997, p.225).

As perceptual and cognitive characteristics relate to individuals differently, the design of an application may take Density into account however it is difficult to precise when this information becomes too dense (Golonka et al, 2014). A low use of memorization and easy steps result in higher acquisition of information, especially when it concerns large amounts of unfamiliar second language items. To exemplify what we delineate as wrong understanding of information density, we show on Figures 4-5 and 4-6, both from the British Council application. On the left, information was presented "too dense" due to the high amount of unfamiliar vocabulary. And the image on the right, comprehension exercises that come after a 10-minute audio and, in fact, require more from memorization than from listening skills themselves.

Figure 4-5 and Figure 4-6: Information Density from the British Council app.
(Source: British Council Podcasts – 2016)

4.5 The Applications in a comparative analysis: Babbel, British Council, Busuu, Duolingo, Speak English

To establish a differentiation in language acquisition perspectives and functions promoted by the selected applications, it is wise to have a comparative analysis of the apps used at this investigation. Although one can find innumerous apps for SLA in the app stores, we selected these five due to their high number of downloads in the application stores (iOS and Android), indicating satisfaction from end-users all over the world. These statistics are from August 2016 and come from PC magazine, appbrain.com, appannie.com, sensortower.com and from the application developers themselves.

We used the criterion of Available (A) and Not Available (NA) for the present versions of the apps as these suffer constant updates and modifications by their designers. This comparative analysis was performed with the version mentioned on the chart and available in August 2016 as this was the version used by participants during the 60-90 days period of use. Due to some automatic updates to smartphones systems

and Wi-Fi constant connection some applications may have updated themselves automatically as well and present nowadays minor differences to the image used in these study pages (Campos & Freitas, 2015). From the administrative information, to the linguistic competence, to features and particularities of each mobile application, this analysis discriminates the most relevant aspects that might have affected the personal choices of participants for one application to another.

During the live presentations of the characteristics from each app, researchers tried not to demonstrate any preference about an application in order to prevent bias affecting choices and personal analysis to be done by the partakers. In Table 4-1 below, we identify the most relevant aspects in the mobile applications selected.

Table 4-1: Comparative analysis of SLA applications, August 2016
Available (A); Not Available (NA)

Mobile Application (August 2016)	Babbel	British Council (Podcasts)	Busuu	Duolingo	Speak English Daily
Version Number (August 2016)	5.6.6.020617(102)	3.6.0.1.3	9.4.9	3.41.1	2.0
Developed by	Lesson Nine	British Council	Busuu Lmtd	Duolingo	ESL Apps
Founded in	2007	2006	2008	2011	2010
Number of downloads worldwide	+50 million	+10 million	+ 60 million	+ 90 million	+ 1 million
Headquarters in	Berlin, Germany	London, UK	London, UK	Pittsburgh, USA	USA
Placement Tests for Starters	A	NA	A	A	NA
CEFR Levels A1/A2	A	A	A	A	A
CEFR Levels B1/B2	A	A	A	A	A
CEFR Levels C1/C2	A	A	NA	A	NA
Speaking Skills Activities	A	NA	A	A	NA
Reading Skills Activities	A	A	A	A	A
Writing Skills Activities	A	NA	A	A	NA
Listening Skills Activities	A	A	A	A	A
Slow Audio Option	NA	NA	NA	A	NA
Automatic Speech Recognition	A	NA	NA	A	NA
Native Speaker or Other Learners Interaction	A	NA	A	A	NA
Immediate Feedback	A	A	A	A	A
Dialogue read by Natives	A	A	A	A	A
Automatic translation to Portuguese	A	NA	A	A	NA
Communicative competence	Linguistic	Discourse	Socio-Linguistic	Linguistic	Socio-Linguistic
Contain Advertising	NA	A	NA	NA	NA
Reset Key	A	A	A	A	NA
Reward-Based	A	NA	A	A	NA
Gamification	A	NA	A	A	NA
Invitation to Friends to Join	A	NA	A	A	NA
Possibility of Data report from app developer	A	A	NA	A	NA
Email Alerts to unfinished Lessons	A	NA	A	A	NA
New Episodes via e-mail	A	A	A	A	NA

Mobile Application (August 2016)	Babbel	British Council (Podcasts)	Busuu	Duolingo	Speak English Daily
Offline Use	A	A	A	A	A
Totally Free of Charge	NA	A	NA	A	A
Paid Content (Premium)	A	NA	A	NA	NA
Cost in Portugal €	9,95/month	0	9,99/month	0	0
Cost in Brazil R$	26,00/month	0	29,90/month	0	0

5 Research Methodology and Design

5.1 The Qualitative and Quantitative Approach in Language Learning Research: the mixed method of this study

For the methodological approach to this investigative research and based on the theme of our study – the Adoption of Second Language Acquisition apps by graduates – we outlined an empirical study to perceive relations between adopting and using smartphones for English acquisition. It was granted that the extent of the empirical data provided had to make sense "of the participants' definitions of the situation, noting patterns, themes, categories and regularities" (Cohen, Manion & Morrison, 2007). It was mandatory to be consistent to a fitness for purpose, understanding the phenomenon of SLA mobile apps' adoption "based on words from a small number of individuals so that the participants' views are obtained" (Creswell, 2012, p.16).

A cross-sectional survey collected data for a qualitative analysis to interpret and test the established determinants. Nevertheless, as descriptive statistics and frequency analysis were used to understand the data, we added some quantitative approach to this work using statistics and frequencies, what makes it better characterized as a mixed method. It is important to assert that methods and procedures should have adequacy to educational research and adaptability to specific situations must be contemplated. For Mackey and Gass (2012), researches in SLA benefit of these choices because "there may be quantification of the survey (questionnaire) data and then a more in-depth, personalized, qualitative description of the topic by choosing a few cases to provide a more concrete illustration of the phenomenon" (p. 99). A combination of methodologies is also recommended by Creswell (2012) as a "good design to use if you seek to build on the strengths of both quantitative and qualitative data" (p. 535). When using different methods, researchers gain from the unique strengths of each approach and also decrease limitations of using a single methodology. On this investigation, researching is understood on the same principles dictated by Anderson and Kanuka

(2003) who consider it “discovering something new for an individual, even if it is knowledge or information known to others” (p. 2).

Participants were surveyed in order to answer inquiries in accordance to literature quests of present and calls for future investigations. On this research, we interpreted “the larger meaning of the findings (...) using flexible, emerging structures and evaluative criteria, and including the researchers’ subjective reflexivity and bias” (Creswell, 2012, p. 16). We had assumptions that were ontological based on the observance of the phenomenon and from this interpretative paradigm (Garrison, 2011); we expected to produce a humanistic and inductive interpretation of reality (Jarvis, 2008; Sharples, 2000). Conclusions have a practical component since our “finalidade de investigação” (Coutinho, 2015) is to comprehend, interpret and discover meanings on the acceptance and adoption of apps and promote linguistic improvement in participants.

Our methodology contains a strong trend to qualitative understandings in its conceptual level since we are trying to “investigar ideias, de descobrir significados nas ações individuais e nas interações sociais a partir da perspectiva dos atores intervenientes no processo” (Coutinho, 2015, p. 28). Authors such as Phakiti (2014), Teles (2013) see language learning investigations as a required necessity for the field and clearly understand one of the issues that haunt language learning researchers: the influence of the outside world in L2 acquisition studies. For Creswell (2012), research is a process containing some logical procedures where investigators “collect and analyze information to increase our understanding of a topic or issue” (p.3). They are controlled, empirical, self-correcting (Cohen, Manion & Morrison, 2007) and must respected an “approach to the discovery of truth” (p.7).

As this doctoral investigation happened simultaneously at two universities in two different countries (Portugal and Brasil), it involved individual characteristics such as academic calendars and schedules, procedures and regulations, graduates’ perception of m-Learning, coordination of courses in granting permissions, and some other issues concerning logistics and mobile technology access to students that somehow may have interfered on results. These issues corresponded to elements pondered by a few authors as Sherman and Webb (2005) that qualitative researches tend to be perceived

as limited due to their “narrowly micro-sociological perspectives” (Cohen, Manion and Morrison, 2007, p. 26).

Cohen, Manion & Morrison (2007), Creswell (2012) and Phakiti (2014) all mention that for researches involving geographical distance from participants, it may be adequate to collect responses through “electronic interviews and questionnaires” (Creswell, 2012, p. 213) and we provided it through four Google forms (see Annex). Questionnaires were generated to fulfill the necessities of the research, were heavily based on the literature and followed the criteria of credibility, transferability and dependability (Cohen, Manion & Morrison, 2007; Creswell, 2012; Phakiti, 2014). Responses of participants were analyzed statistically to establish the reliability and validity of the assumptions taken. As validity, we understand the best approximation of the truth of a proposition or an inference (Golafshani, 2003), it is about “the accuracy, correctness and legitimacy of the measurements and observations made during data collection, and the soundness of the inferences made on the basis of the data collected” (Phakiti, 2014, p. 84).

The constructs measured what we intended certifying our construct validity and if this study is replicated under the same circumstances, external validity could be assured. We adjusted the survey questions before using the questionnaires through some UNIT graduates of the English Language course. Participants entered the research in a volitional manner as invitations to join were made after live presentations or via newsletter, email and Facebook posts to groups of FCT and FCSH. Our first sample accounted for 188 participants who attended the live presentations and answered Questionnaire 1. Questionnaires #2 and #3 had 173 answers as fifteen individuals failed to deliver these two mandatory quizzes. We continued the research with 173 participants at both institutions.

5.2 The Design-based Research of this PhD study

When choosing a format for the methodology, we envisioned a Design-based Research – D-bR (Anderson & Shattuck, 2012; Barab & Squire, 2004; Ramos, Giannella & Struchiner, 2010; Reeves, 2006) due to the essence and empirical nature of the

approach in understanding alternative methods, especially for teaching and learning researches. And when involved with a study about and conducted with electronic technologies (an "e-research"), we have to be really aware of not becoming "seduced by the technology itself, rather than the effects of it, producing results that have little relevance and/or significance" (Anderson & Kanuka, 2003, p.31).

Adopting unusual learning methods in a teaching environment is not an easy task, hence, we established this work within the concepts of a Design-based Research (D-bR) as developed by Costa (2013), Herrington, McKenney, Reeves & Oliver (2007), Barab and Squire (2004), Anderson & Shattuck (2012) and also with the concepts by Collins, Joseph, & Bielaczyc (2004). These authors write about formulas of "producing new theories, artifacts, and practices that account for and potentially impact learning and teaching in naturalistic settings" (Barab & Squire, 2004, p.2). Checking some other references who recommend inquiries with Design-based research, it is mandatory an interpretation of exactly which improvements those researches can add to society nowadays.

Publications establish that D-bR "holds great promise for enhancing both the theoretical contributions and public value of educational technology research" (van den Akker, Gravemeijer, McKenney & Nieveen, 2006, p.4). Even so, attention must be paid to the fact that D-bR is a work-in-progress and many works focus exclusively on successful stories that show the "gains of technology – facilitated learning over conventional methods of teaching with little regard for an understanding of how or why the gains might have been realized" (Herrington et al., 2007, p.1). Since we expected to examine through this study sample and highlight how and why second language acquisition applications transform language learning nowadays, Design-based research was the chosen method for our educational inquiry. Nevertheless, this was an individualized format for a D-bR as we used cross-sectional survey in two moments to our particular case with two distinctive countries and institutions operating with calendars and schedules in different months of the year. These differences created a few factors that impeded a more cyclical experiment.

In fact, our objective was to verify the readiness and acceptance of participants for the SLA apps and this was executed in the cycle we presented. Supposing we could have a 2nd cycle to our D-bR, it would start after the 90 days of the usage of the applications

by participants. Hypothetically, we would submit our graduate students to a 2nd proficiency test and verify if some linguistic progress was made in comparison to proficiency test #1. For instance, if the participant was graded as an A2 (3/10) on proficiency test #1, we would submit him/her to a second evaluation and try to perceive some progress as moving to a B1 level (4/10 or 5/10 correct answers). If this possible progress was achieved, we would challenge the participant and suggest higher levels of CERF in the same app, if available. In the case of not having a higher linguistic level available in the app the participant used, we would suggest another mobile application with higher levels of English.

However, if the participant did not present a linguistic development, we would recommend using the same application all over again as they did for the first time. Having in mind that our research questions were not about linguistic advancements, but to assess the readiness and acceptance of apps; we believe this could create higher levels of commitment to accept the mobile applications. We also would submit partakers to another questionnaire (Q5) where we would gather opinions of the students about the m-learning experience (as we did on Questionnaire 4) but now with the aspects of the Facilitating Conditions – the opposite of what we formulated our UTAUT+M to evaluate Hindering Conditions as a determinant. The lack of time to create the 2nd cycle was an issue since the work was held both in Brazil and Portugal and it might have affected the full scope of this methodological approach.

According to Reeves (2006) and part of literature (Collins, Joseph, & Bielaczyc, 2004; Ramos, Giannella & Struchiner, 2010), Design-based researches have to be feasible, worthwhile and aggregate some contribution to its field. A Db-R is divided into four main phases. The first is the Analysis of Problems which comes followed by the Development of Solutions. The number three is composed by Iterative Cycles of Testing and finally, the fourth and last phase is the Reflection to enhance Solutions as it is illustrated on Figure 5-1.

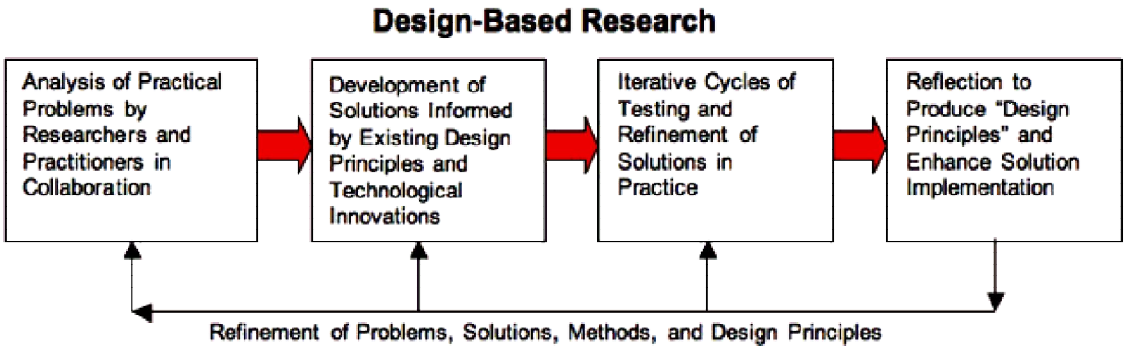


Figure 5-1 The 4 Phases to a Design-based Research. (Source: Reeves, 2006)

As for Phase #1 in our research, we outlined an analysis of the practical problem – Participants have smartphones but rarely used it for acquiring a second language. As a solution and refinement to the issue, we developed a strategy to promote and bring this knowledge to them, expecting their responses to be a form of collaboration. The questions put to participants followed guidelines available from most pertinent literature on the topic.

As phase # 2 indicates, we informed participants during the presentations of the features and characteristics of the apps and their existing design principles sharing information about specific mobile technology innovations now available. As volunteers agreed to try the suggested apps for the period of 60 to 90 days, they chose their favorite app among the selected mobile VLEs and revealed their impressions on responses to questionnaire #4 which was used for feedback. Since partakers of the applications were having some issues to understand them completely, we "refined solutions in practice" through e-mails and whatsapp messages to eliminate doubts – acting exactly in agreement to what constitutes phase number 3.

On this contact, we also gathered information relevant to the data as these interventions contributed to the final analysis and results presented. As for the final phase #4, we here state our first minor diversion from original D-bRs as our conclusion was not to "produce design principles" but to enhance solutions and possible implementations. This 'fine-tuning' between researcher and participants serves to help to delineate what is already known about the problem and to guide the development of potential solutions (Herrington et al., 2007).

We sum up the methodological support with the conceptual idea of Barab and Squire (2004) reflected in the affirmation that a "design-based research suggests a pragmatic philosophical underpinning, one in which the value of a theory lies in its ability to produce changes in the world" (p. 6). During and after these four phases of our D-bR, we gathered data "systematically identified" (Creswell, 2012) and evaluated their responses on the learning process, linguistic benefits, technology readiness level, hindering conditions and linguistic problems. We then deduced from responses on how the apps fulfilled their learning expectations. As mentioned beforehand, these selected applications for this PhD research came from the list of the most downloaded ones in the English Learning category from the App Store (iOS) and Play Store (Android) – Duolingo (+ 90 million downloads), Busuu (+ 60 million), Babbel (+ 50 million), British Council (+ 10 million) and Speak English Daily (+ 1 million). These numbers are from August 2016.

5.3 From UTAUT to UTAUT+M: Determinants and Research Questions

When formulating our adaptation of the unified theory for the acceptance and use of technology (UTAUT) for consideration of mobile use (UTAUT+M) on this PhD study (cf. 3.3), we established Determinants, Variables and Attributes (Akbar, 2013; Martinho, 2014; Pires & Costa Filho, 2008; Van Raaij & Scheppers, 2008) to understand the adoption and/or rejection of the aforementioned applications. As Determinants, we selected Performance Expectancy (PE), Linguistic Relevance (LC), Hindering Conditions (HC), Technology Readiness for m-Learning (TR) and Voluntariness of Use (VU) that acting together and resulting from the perception taken at the Knowledge and Persuasion (KP) phase have a positive influence on the Acceptance which may end in Adoption (AA) or Rejection (RJ) to the Apps as seen on Figure 5-2.

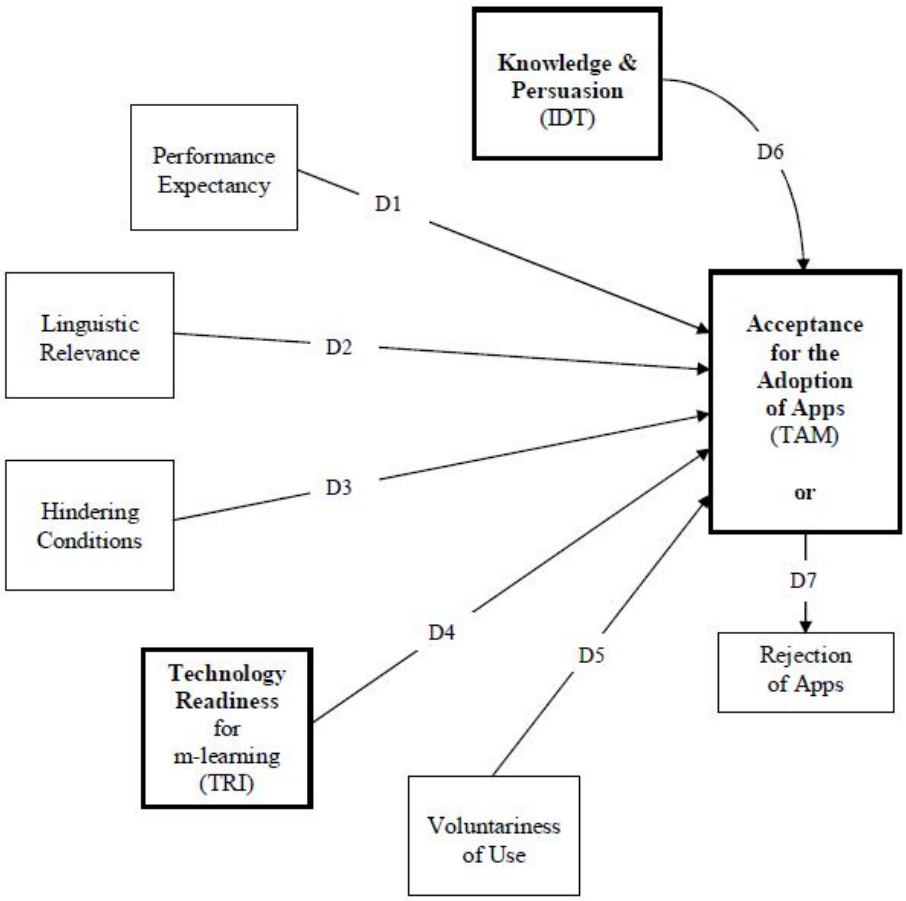


Figure 5-2: Adapting Variables and Determinants in the formulated UTAUT+M for this study (cf. Figure 3-10)

The definitions and co-relations of the Determinants (Akbar, 2013; Martinho, 2014; Pires & Costa Filho, 2008; Van Raaij & Scheppers, 2008) are delineated as it follows and were aimed to answer the two (02) research questions proposed in this empirical study. Question #1 was to identify responses that confirm if graduate students are ready to mobile technology acceptance and adoption of smartphone virtual learning environment applications, making use of them as English language learning tools (Adelina & Carvalho, 2011; Mozzaquatro & Medina, 2008; Park & Slater, 2013). Percentages of Adoption and of Rejection are detailed in the results and establish the conclusions to it. For the Question #2, it was proposed to select which of the SLA applications best served to participants' needs with the English language and could be

recommended for curriculum development in higher education institutions. The final evaluation is also dealt in Chapter 7.

Defining the Determinants (Akbar, 2013; Martinho, 2014; Pires & Costa Filho, 2008; Van Raaij & Scheppers, 2008) in a more comprehensive perspective, we can establish them as determinants (variables) that have a correlation and "play a role as surrogates" to the acceptance and adoption of apps as a result. For the determinant Performance Expectancy (PE) we state the determinant D1. On it, there is a correlation that PE had a positive effect and influenced on acceptance for the adoption of apps. The formulated determinant is composed by principles seen on literature and labeled as relative advantage (Q1P3) and productivity (Q3P1). The codes in parentheses refer to the questionnaire (Q) where this information was obtained and the question number (P) on it, available on Annexes 1, 2, 3, 4.

For determinant D2, we understood that Linguistic Relevance (LR) (Chomsky, 1955) had a positive effect and influenced on acceptance for the adoption of apps when LR was verified by the reason why (Q1P1) participants needed to learn English and also for difficulties in terms of language skills (Q1P5) they pointed to have. The proficiency test (Q2P1-10) answered by them helped us to confirm some of these assumptions. For determinant D3, we established one of our original contributions as a PhD research, since literature presents this determinant as "Facilitating Conditions" and we inverted the semantic meaning to understand conditions that hindered acceptance and adoption, extending literature to other areas. We established Hindering Conditions (HC) as a construct and imply that these conditions have a *negative* effect on acceptance for the adoption of apps. These conditions were measured through participants' responses about the most difficult aspect they faced when studying with smartphones (Q4P4). To emphasize hindering aspects linked to subjective norms and technology as literature recommends, we inquired about how they felt when lack of technology expertise was demonstrated in front of peers (Q3P6).

For D4, we determined the correlation that Technology Readiness for m-Learning (TR) delineated as a positive effect and influenced on acceptance for the adoption of the apps. This readiness was assessed estimating how comfortable participants felt in using mobile technology (e.g. smartphones) for learning activities (Q1P2) and we also inquired whether they agreed that learning content should be delivered online in higher

education institutions, leaving teachers with the role of coaches or mentors (Bax, 2003; Jurkovič, 2006) to classroom debates (Q3P7).

Both were crucial elements for the reformulated UTAUT we proposed because the level of their readiness (Parasuraman, 2000; Parasuraman & Colby, 2015) during this mobile learning experience is what helped us to reformulate the original unified theory into our adaptation that was called a UTAUT+M, the M standing for mobile. Since a lot of participants declared this was their first time ever learning an idiom through a smartphone, the freshness and uniqueness (Zhang, 2012) of this experience for the students enriched our interpretation on their acceptance and adoption of the mobile applications.

The next determinant that had a correlation effect on adoption was Voluntariness of Use (VU), labeled as D5. VU was estimated arguing how participants felt since they could use the apps anytime of the day for learning (Q3P3) and how long (hours/week) they could spend on the app exclusively for L2 acquisition (Q1P4). All these units of measurement are part of literature for acceptance of technology and were adapted to the reality of this study.

The final two determinants, D6 and D7 were analyzed under a diverse perspective in the correlation to acceptance and adoption of apps in D6. Resulting from responses on how participants perceived the apps and the objectives of the research on the live presentations at UNL and UNIT (Q4P2) we verified if, knowledge and persuasion had a positive influence to the participation in this research as well as in the adoption of apps. The last assumption or determinant, D7, is the denying of all previous ones as it reflects the rejection of the apps. Participants who did not install any app or that installed one (or more) and later abandoned them have to be included as they also posit important arguments that must be heard. These determinants and assumptions essentially answered the research questions of this inquiry and contemplate our attempt of mixing three theories to examine mobile usage: Technology Acceptance Model, Innovation Diffusion Theory and Technology Readiness.

6 Data Collection and Analysis

6.1 Participants and Questionnaires

Concerning the elements of Data Collection, Statistical Analysis and Conclusions, we observed and followed the concepts proposed by Cohen, Manion and Morrison (2007), Creswell (2012), Lüdke & André (1986), Phakiti (2014) and surveyed participants to amplify the lenses of the study undertaken here. We took into account the data produced by a cross sectional survey with convenience sampling used to recruit participants. These individuals provided data under the premises of our research questions and literature that was coded and analyzed through *the IBM SPSS* software for *Windows* and *Microsoft Excel* from *Microsoft Office*. It was executed a full and thorough understanding of the elements measured, i.e. Gender, Age, Institution Affiliation, Proficiency Level, Reason to Study English, Time available to use the Apps, Performance Expectancy, Linguistic Relevance of the idiom, Readiness for m-Learning, Conditions that hinder adoption, Voluntariness of Usage, Difficulties with the language and mishaps in using a cell phone as learning tool. We also how well they understood the research objectives and the applications' features on the face-to-face presentations. After analyzing these data we came to conclusions based on principles and reference authors.

It is relevant to mention that the specificity of this very research, unforced adoption of new technologies (Rogers, 1983; Straub, 2009) – implied a series of procedural restraints since we could not insist heavily on graduates' adoption and participation; or inevitably harm the concepts of autonomous adoption and the voluntariness (Venkatesh & Bala, 2008) in it. Therefore, we did not contact participants who failed to deliver responses more than three times and refusals were considered part of the mortality rate of the research. After Questionnaire 4 was responded and delivered, our final sampling was delimited. Due to calendar and schedule conflicts between both institutions, financial limitations of the researchers and bureaucracy procedures we could not go back to Brazil after the 90-day period and conduct semi-structured interviews with participants from UNIT in person, therefore we opted for

having the online questionnaires as the source of data. They provided sufficient responses to most of the issues of this research appropriately but they should not be generalized.

We explored three different theories on our formulated UTAUT+M (Technology Acceptance, Innovation Diffusion and Technology Readiness) and the questions and assumptions presented on the surveys included the most important principles from each one of them. At Universidade Tiradentes, among the methodological procedures prior to the administration of the research, we had to comply with all requirements of Plataforma Brasil, a mandatory permission necessary for researches involving human beings in the country before research itself can proceed – from initial procedures to approval it took 120 days to be granted; and this fact created some hazard to our already tight schedule. At UNL, either at FCT or at ILNOVA/FCSH we were not required anything similar.

At Universidade Tiradentes, after explaining the procedures and objectives to the Head of the Departments and granted access to some specific groups, we performed a 40-minute presentation to the courses made available. At the Biomedicine course, two groups from the 5th semester and one group from the 6th semester with a total of 53 participants attended our talks and answered Questionnaire 1. From the Petroleum Engineering course, we had two groups at our disposal: one from the 5th and one from the 8th semester were selected totaling 53 respondents to Q1. English Language was one of the courses with fewer students enrolled at Universidade Tiradentes but where we have more access as an Associate Professor from the department; hence, the English Language course provided us with all 43 graduates from every semester available in 2016 who responded Q1 as well; taking the initial sample of UNIT individuals to 149 people.

At Faculdade de Ciências e Tecnologia (FCT/UNL), we used the formal required procedures of the Communication Division and invited via newsletters and institutional emails all graduate students of FCT for 40-minute presentations scheduled at the FCT Library in three different days and times (mornings, afternoons and evenings). This was intentionally done to offer a chance to participants find available time into their hectic college activities. After these three encounters, the total amount of FCT participants interested in voluntarily participate accounted for 29 people. At UNL FCSH-ILNOVA, the

Director put us in contact with two English teachers – Rima Prakash and Bernardo Palmeirim – both working with Elementary and Low Intermediate groups and the total of participants interested in contributing in the study was 10. So, UNL participants totaled 39 individuals.

Aware that some other potential participants from other courses at UNL could join the research, we had A4 color posters spread in all departments and restaurants of FCT and of FCSH to remind students of the research in progress. As a current tendency and to establish an online presence of the investigation, we posted invitations to participants in two Facebook groups attended by FCT and FCSH students but unfortunately, responses were minimal. In the end, the total sample size of the two universities combined (UNIT and UNL) amounted to 188 people (N = 188). According to requirements, all elements of anonymity were guaranteed to participants. The ethos of our study was the acceptance and potential adoption of SLA mobile apps, so the approach for the empirical study (Golonka et al., 2014; Pinho & Soares, 2011) was focused on the observation and measurement of reality, "perceiving the world around us" (Trochim, 2006) as it really is.

As mentioned, to keep participants "free of bias", minimum contact between the authors and sample participants was maintained via email and whatsapp in order to avoid the Observer's Paradox, "a term coined by sociolinguist William Labov (1972), where the presence of an observer changes the behavior of those being observed" (Friedman, 2011, p. 187). An excessive reinforcement could have affected undeniably the validity of the voluntariness in our analysis. Validity is understood as "the degree to which all of the evidence points to the intended interpretation of test scores for the proposed purpose" (Creswell, 2012, p. 159).

The procedure used a convenience sampling, non-probabilistic (Cohen, Manion & Morrison, 2007; Creswell, 2012; Phakiti, 2014; Trochim, 2006) and focused on an objective truth of participants accepting and adopting the apps after they were informed about them. It was established correlations from determinants (Akbar, 2013; Martinho, 2014; Pires & Costa Filho, 2008; Van Raaij & Scheppers, 2008) to explain attributes representing positive influences to SLA apps adoption: the Readiness and Perception of participants to the advantages presented in SLA apps and consequent acceptance and adoption of these to improve English learning. According to Creswell

(2012), Mackey and Gass (2012), Phakiti (2014), it was highly appropriate to use a cross-sectional survey when measuring attitudes and practices (Creswell, 2012, p. 377) as many works in literature concerning technology adoption have done previously (Kurtz et al., 2015; Long, 1990; Sampson et al., 2013).

The responses were obtained through printed and online versions of questionnaires containing closed-ended questions and one open-ended, most of them in an ordinal measurement since attributes are ordered. According to Creswell (2012), "the advantage of this type of questioning is that your predetermined closed-ended responses can net useful information to support theories and concepts in the literature" (p. 220). To ensure content validity of our scales, the items chosen for the questionnaires were adapted to this specific study and were found on literature (Dörnyei & Taguchi, 2009).

Our sample started with 188 participants who attended the presentations and had three days to answer the questionnaires on Google forms or hand back the printed copies delivered to them. After extending those three days to a two-week waiting period and some contacts suggesting the participation (via e-mail and whatsapp messages), fifteen were eliminated as they did not respond the printed version or the Google Form available online of Questionnaires 2 and Q3 decreasing our sample to 173 participants. The updated numbers after this were Biomedicine – 53, Petroleum Engineering – 51 (2 participants less), English Language – 43 and FCT – 26 (13 participants dropped out, an alarming value).

Questionnaire 1 had requests to establish a personal profile of graduates in relation to their level of comfort with smartphone use, reasons to study English, time available to experience the apps per week, the advantages of learning a language with mobiles and the difficulties with English as in listening skills or grammar rules. Questionnaire 2 was composed of a 10-question English language proficiency test, including A1, A2, B1 and B2 based on CEFR (Common European Framework of Reference for Languages) questions to confirm some of the difficulties mentioned. It covered grammatical aspects such as verb tenses and use, preposition allocation, conditionals, passive voice and adjective comparison. Questionnaire 3 measured the index of Technology Readiness in participants via a 10-Likert scale that estimated their

degree of Optimism, Innovativeness, Discomfort and Insecurity towards being ready for new technologies.

The last questionnaire, the one presenting feedback for our analysis was Questionnaire 4, only available on the online version and answered 60 to 90 days after live presentations were made. It was elaborated to assess key information on which app or apps have been used by participants, frequency and their rate of adoption of these apps. On it, and we also inquired about the comprehension participants had from the live presentations concerning applications' features and the research objectives. We end it, inquiring partakers to point out the negative aspect of using smartphones as a second language learning tool – a hindering aspect that is necessary for Determinant 3.

In Table 6-1, it is presented the variables from the questionnaires used on the analysis and the corresponding determinants of our formulated UTAUT+M and they were Performance Expectancy (PE), Linguistic Relevance (LR), Hindering Conditions (HC), Technology Readiness for m-Learning (TR), Voluntariness of Use (VU), Knowledge & Persuasion (KP) and Acceptance and Adoption (AA). We also include the level of measurement and the type of analysis executed.

Table 6-1: Variables, Determinants, Level of Measurement and Analysis

Variables	Determinant	Level of Measurement	Analysis
University	-	Nominal	Descriptive Analysis (frequencies)
Gender	-	Nominal	Descriptive Analysis (frequencies)
Age	-	Ratio	Descriptive Analysis (frequencies)
Advantages - smartphones for learning	D1/PE	Nominal	Descriptive Analysis (frequencies)
Educational Productivity w/ ICT	D1/PE	Ordinal	Descriptive Analysis (frequencies)
Reason to study the language	D2/LR	Nominal	Descriptive Analysis (frequencies)
Difficulties with the language	D2/LR	Nominal	Descriptive Analysis (frequencies)
Proficiency Level in English	D2/LR	Interval	Descriptive Analysis (frequencies)
Negative Aspect - smartphones for learning	D3/HC	Nominal	Descriptive Analysis (frequencies)
Embarrassment for lack of knowledge	D3/HC	Ordinal	Descriptive Analysis (frequencies)
Level of comfort - smartphones for learning	D4/TR	Nominal	Descriptive Analysis (frequencies)
Online Content Delivery	D4/TR	Ordinal	Descriptive Analysis (frequencies)
Available time per week	D5/VU	Nominal	Descriptive Analysis (frequencies)
No regular class schedule	D5/VU	Ordinal	Descriptive Analysis (frequencies)
Opinion about live presentation	D6/KP	Nominal	Descriptive Analysis (frequencies)
Application used	D7/AA	Nominal	Descriptive Analysis (frequencies)
Frequency of App use after 60-90 days	D7/AA	Ordinal	Descriptive Analysis (frequencies)

Unfortunately, but respecting the idiosyncrasies of a research in volitional involvement (Ferreira et al., 2012; Pintrich, 2004; Zimmerman, 2008) with unfamiliar technologies; from the 173 participants, a total of 60 did not respond questionnaire 4 after 60-90 days of use. We insisted with three requests in electronic messages via email or whatsapp and were not answered. Unfortunately, sixty individuals were eliminated from the research. Total sample was finally defined at 113 participants (N = 113), corresponding to 80.7 % of the total number we aimed as a PhD project approved at FCT/UNL in which we estimated to gather 140 people involved.

When comparing the data of the 173 participants who answered Q1, Q2 and Q3 to the final 113 participants (the ones who also answered Q4) we assessed that Petroleum Engineering lost 41.1% of initial participants, Biomedicine had 39.6% less of its first partakers, FCT decreased its number by 34.6% and English Language lost only 20.9% of the students. These may be understood as the first conclusion we may take from the study showing how universities and courses reacted to the research and demonstrated

interest in learning the language via mobile apps. On the 173 total (Q 1, 2, 3) we had 101 females and 72 males however when sample reached its final number of 113 total (Q4) we ended up with 65 women and 48 men. The average of ages in the 173 group was 22 and it decreased to 21,5 on the final sample. As a last information on these data comparison, concerning the proficiency level of English, on the larger group (173) the average was B1 (5/10) where students had five correct answers out of ten and it dropped to B1 (4/10) on the sample we used for the complete study.

As mentioned before, Questionnaire 4 was the most important in the study because it concluded the research while it evaluated the main aspects of the study: which app was adopted by the participant, how often has the application been used and which was the hindering, negative aspect of using the smartphones as learning tools? Consequently, data collected before Q4 have a value that is not sufficient for the results and conclusions here. Concerning the 113 real participants in the study they were distributed by Gender and University as it can be seen in Table 6-2.

Table 6-2: Number of participants and percentages by Gender and University

	F		M		FM	
Biomedicina UNIT	19	59,4	13	40,6	32	28,3
Eng. Petróleos UNIT	12	40,0	18	60,0	30	26,5
Letras UNIT	21	61,8	13	38,2	34	30,1
UNL	13	76,5	4	23,5	17	15,1
	65	57,5	48	42,5	113	100,0

Detailing our sample a little further, the total of participants by gender and university enrolled displayed that women corresponded to 65 participants (57.5%) of the research and men were 48 in total, corresponding to 42.5% of the answers. More details about the sample are available at the statistical analyses and results as follows.

6.2 Statistical Analyses and Results

In order to understand our sample and demographic data better, it was developed a descriptive analysis of its frequencies and correlations to clarify how these numbers translated the findings and answered to the research questions proposed at Chapter 1. Due to detailed description, tables are closely intertwined to provide a more adequate perception of our assessment. During the first stages of evaluation and to aggregate meaningfulness to results, we decided to merge FCT and Ilnova participants into one group labeled UNL. As it can be seen in Table 6-3 below, total number and percentages of participants per university and course are available with the English Language course providing 34 respondents to the inquiry – 30.1%. Biomedicine provided 32 participants corresponding to 28.3% and Petroleum Engineering helped our research with 26.5% of the participants (N=30), closing the sum from UNIT/Brasil. The Portuguese share at UNL was composed of 17 participants who were responsible for 15.0% of the answers.

Table 6-3: Number of participants and percentages by University and Gender

	F		M		FM	
Biomedicina UNIT	19	29,2	13	27,1	32	28,3
Eng. Petróleos UNIT	12	18,5	18	37,5	30	26,5
Letras UNIT	21	32,3	13	27,1	34	30,1
UNL	13	20,0	4	8,3	17	15,1
	65	57,5	48	42,5	113	100,0

It is wise to ponder that voluntary adoption to an academic research (Creswell, 2012) is hard in itself, and we add to this factor the volitional adoption (Kurtz et al., 2015; Shorfuzzaman & Alhussein, 2016) of a mobile application as research subject, thus the level of voluntariness involved in this empirical study is an issue to ponder. Moving to the next aspect to establish the demographics, the age of participants and in Table 6-4 below it is presented the average of Ages and its standard deviation by Course and Gender. As a starting point, participants from Biomedicine and Petroleum Engineering (UNIT) are graduate students in their first university course, hence average of ages and standard deviations are somehow correlated. As the English Language

course includes participants in their 40's, standard deviation was higher. This also happened to UNL volunteers who have first graduates among them but also a few individuals from Master and Doctorate programs resulting in age average and standard deviation to be higher as well. From experience and literature, we know that youngsters are more familiar with smartphones (Horst & Miller, 2013; Kukulska-Hulme et al, 2011; Oblinger, 2006) and this fact isolated may have helped the readiness to accept and use of the SLA apps by the graduates from these two courses unintentionally.

Table 6-4: Average age and standard deviations by Gender and University

	F	M	FM
Biomedicina UNIT	20,8	20,2	20,5
	(2,86)	(2,51)	(2,70)
Eng. Petróleos UNIT	22,7	22,6	22,6
	(3,65)	(2,57)	(2,99)
Letras UNIT	24,9	24,2	24,6
	(7,17)	(5,79)	(6,59)
UNL	30,9	35,8	32,1
	(11,35)	(15,02)	(11,97)
	24,5	23,5	24,1
	(7,61)	(6,58)	(7,18)

The next element to be considered on the statistical analysis concerning the profile of participants is the level of English Proficiency they revealed on the 10-question multiple choice test that was answered by all volunteers (Table 6-5) below. The proficiency assessment was based on the Common European Framework of Reference for Languages (Little, 2007; Marçalo, Fonseca & Silva, 2010) and presented questions from A1, A2, B1 and B2 levels as in placement tests that are generally used to determine the proficiency of students. C1, C2 parameters were not included owing to the fact that the selected five apps almost do not include such advanced stages in most of their contents.

Table 6-5: English Proficiency by course and gender – average of grades and standard deviation (Grades: Minimum 0.0; Maximum 10.0)

	F	M	FM
Biomedicina UNIT	**4,7**	**3,8**	**4,3**
	(2,16)	(1,83)	(2,05)
Eng. Petróleos UNIT	**5,4**	**5,1**	**5,2**
	(2,07)	(1,81)	(1,89)
Letras UNIT	**6,6**	**6,6**	**6,6**
	(2,73)	(1,89)	(2,41)
UNL	**6,5**	**5,5**	**6,2**
	(2,73)	(1,91)	(2,54)
	5,8	**5,2**	**5,5**
	(2,52)	(2,08)	(2,37)

Demonstrating logic, English Language participants achieved a higher grade on tests independently of gender, followed by UNL attendees who possibly know more of the idiom due to living in Europe and to the internationalization standards of UNL, associated to the post-graduation status of a few of the subjects. Petroleum Engineering had grades close to average (5.5) with women exhibiting some higher numbers than men. In the end, Biomedicine males had the worst result on proficiency tests – 3.8, lowering the course average to less than five points (4.3).

With this initial panorama detailing participants' gender, age, course and proficiency level, we then begin the statistical analysis of the determinants and variables of our formulated UTAUT+M (Figure 5-2) that led to the acceptance and potential adoption of the mobile applications. After a three-month period using the apps, participants replied to inquiries on Questionnaire 4 which included: "*After 60 to 90 days of contact with the apps, how is your usage of the mobile applications?"*Correlating the responses of all 113 participants on questionnaires 1, 2, 3 and 4 (see Anexxes), we obtained results that helped to answer our main objective – verify the acceptance and readiness of participants into becoming adopters and potential re-adopters of mobile applications as English language learning tools (Adelina & Carvalho, 2011; Park & Slater, 2013); therefore confirming the determinants (Akbar, 2013; Martinho, 2014; Pires & Costa Filho, 2008; Van Raaij & Scheppers, 2008) and elements that formulated our UTAUT+M.

On the account of what constitutes an Adopter (Ahmad, 2014; Paiva, 2010; Rogers, 1983; Sahin, 2006), we categorized them in two different perspectives according to responses. If the observed participant answered his/her app usage was "The Same/Increased", he/she was considered as an Adopter of the applications, a user of the system. However, if the participant responded Questionnaire 4 with "Decreased/Retake", we are under a strong impression that they have an intention of (re)using the apps again; hence he/she was labeled "Potential Re-Adopters".

In fact, these partakers identified the features in the applications (Carneiro, Lefrere, Steffens & Underwood, 2011), perceived the potentialities (Alda & Leffa, 2014) of second language learning and perhaps available time or poor internet connection may hinder the use temporarily, a theme for future research indeed. We have to emphasize the fact there was an option "Decreased/Quit" and these "Potential Re-Adopters" did not choose this one.

Adopters and Potential Re-Adopters are then considered on the category of Acceptance for the Adoption of apps (see UTAUT+M – Figure 5-2) and accounted for 82 out of 113 participants (72.5%). After the three-month period, twenty-six of them answered their use kept the same or increased and, as mentioned, we considered these individuals as "Adopters" in this study. Fifty-six had some decrease in use but plan to reuse the apps again; hence we placed them in a category labeled "Potential Re-Adopters". Twenty-two used the mobile apps, then discontinued with the utilization and were labeled "Quitters" and a clarification must be available here.

We considered "Quitters" the individuals who indeed tried and used the apps or partakers who may have downloaded an app but never used it. For statistical reasons and due to avoid semantical debates, they were placed under the same category (Quitters) although we understand their differences in each case. The nine remaining individuals did not install any of the apps, they have answered all the questionnaires required though, so we ended up placing them in a category labeled "Non-Installers" and on Table 6-6 below, we detailed these categories and their values and rates.

Table 6-6: “After 60 to 90 days, how is your usage of the mobile applications?” Number of participants and percentages

F	The same / Increased		Decreased / Retake		Descreased / Quit		Did not install	
Biomedicina UNIT	7	36,8	10	52,6			2	10,6
Eng. Petróleos UNIT	2	16,7	8	66,7	1	8,3	1	8,3
Letras UNIT	5	23,8	9	42,9	6	28,6	1	4,7
UNL	1	7,7	3	23,1	8	61,5	1	7,7
	15	23,1	30	46,2	15	23,1	5	7,6
M								
Biomedicina UNIT	3	23,1	10	76,9				
Eng. Petróleos UNIT	3	16,7	8	44,4	3	16,7	4	22,2
Letras UNIT	4	30,8	8	61,5	1	7,7		
UNL	1	25,0			3	75,0		
	11	22,9	26	54,2	7	14,6	4	8,3
FM								
Biomedicina UNIT	10	31,3	20	62,5			2	6,2
Eng. Petróleos UNIT	5	16,7	16	53,3	4	13,3	5	16,7
Letras UNIT	9	26,5	17	50,0	7	20,6	1	2,9
UNL	2	11,8	3	17,6	11	64,7	1	5,9
Total	26	23,0	56	49,6	22	19,4	9	8,0

After this initial panorama of who adopted or not this m-Learning experience promoted, the first determinant to be submitted to the descriptive statistics of Adopters and Potential Re-Adopters formulated in our UTAUT+M is Determinant 1 – Performance Expectancy (PE) and the variable analyzed was the Advantage of learning English on smartphones (Q1P3). This advantageous reason (in D1) is based on literature of Ahmad (2014), Sahin (2006) and especially Rogers (1983), who labeled it Relative Advantage, and stated it as the attribute potential users measure in terms of financial reward, convenience, social prestige; and for Rogers (1983) what really counts for is whether the individual perceive the innovation as beneficial.

This item was composed of 04 possible choices that according to literature represent advantages in adopting mobile assisted language learning. The options that reflected this advantage were: to be outside of a learning environment, establish your own rhythm of studies, the technological aspect involved or the cost of the apps (free or for a small fee). Certainly, there are many other reasons for adopting an app and these

decisions were self-imposed (Zimmerman, 2008) and a result of freewill (Jarvis, 2008). For the five apps selected here and for our participants, 47.5% of these (adopters and potential re-adopters) considered Own Rhythm as the most positive influence on adopting the applications. With that, an Advantage as Own Rhythm can be seen as a positive influence to Adoption as described in Table 6-7. In accordance to Kukulska-Hulme et al. (2011), Martins (2015), Teles (2013), own rhythm establishes freedom of choice to determine how paced students want to progress and this is a characteristic hardly seen on traditional formal settings.

Table 6-7: D1 - Performance Expectancy – Advantages of learning English on smartphones

	Outside Environment	Own Rhythm	Technology	Cost	Total
Adopters	10	12	4	-	26
Potential Re-Adopters	18	27	7	4	56
Total 1	28	39	11	4	82
% of Acceptance **due to...**	**34.1%**	**47.5%**	**13.5%**	**4.9%**	100%
Quitters	4	13	2	3	22
Non-Installers	1	5	1	2	9
Total 2	5	18	3	5	31
Total 1+ Total 2	33	57	14	9	113

The other advantage worth mentioning is the possibility of using the applications and acquiring language outside of formal learning environments, for 34.1 % of participants this seems to be a great characteristic of m-Learning and also respond to literature calls as seen in Blake (2008), Carneiro (2011), Liu, Navarrete, Maradiegue and Wivagg (2014), Martins (2012) and Stockwell (2010). Consequently, if we understand that potential re-adopters and adopters in this empirical study see on those two advantages a reason for continuing using the apps, we could answer one of our research questions.

The other issue that accounted for the Performance Expectancy (Determinant 1) of participants and influenced positively Acceptance and Adoption of apps was the answer to Q3P1 – *if they agreed or not that technology makes them more productive in*

educational contexts. This assumption is adapted from Carvalho et al. (2012) and from Venkatesh et al. (2003) and assessed advantages and readiness at once. It was stated as an assumption in Questionnaire 3 (see Annex), a Likert scale response that answers to: "Technology makes me more productive in educational contexts". During the live presentation of this statement, we emphasized that what they must comprehend is if they "learn better" or "learn more" when using ICT; reinforcing it was not a question of faster access to information.

Respondents presented a strong agreement to the assumption before using the apps and Adopters and Potential Re-Adopters after the 60-90 days, confirmed that with 30.4 % 'totally agreeing' with the issue and 62.2% of them 'agreeing' to this idea as seen in Table 6-8. If we add both due to semantical reasons we would obtain a staggering 92.6 % concordance establishing that Determinant 1 (D1) had a positive influence on Acceptance.

Table 6-8: D1 - Performance Expectancy – Agreement to technology increasing Productivity in educational contexts

	Totally Disagree	Disagree	Neutral	Agree	Totally Agree	Total
Adopters	-	-	-	19	7	26
Potential Re-Adopters	-	-	6	32	18	56
Total 1	0	0	6	51	25	82
% of Acceptance due to Productivity	-	-	(7.4%)	**62.2%**	**30.4%**	100%
Quitters	-	2	1	8	11	22
Non-Installers	-	-	1	5	3	9
Total 2	0	2	2	13	14	31
Total 1+ Total 2	0	2	8	64	39	113

This has been a confirmation to what literature has presented as seen in Blake (2008), Joseph, Corbeil & Valdes-Corbeil (2007) or in Van Raaij and Schepers (2008) who perceived ICT entrance in education as an inevitable element to "increasing study productivity" (p.848). As a last remark on this issue, it would be interesting to evaluate for future study the case of participants who 'totally agree' with the assumption but "Quit" or even "Did not install" the mobile applications.

Moving through the UTAUT+M, we come to Determinant 2 (D2) which corresponds to an important component to the acceptance and adoption of a Second Language Acquisition app because it deals with Linguistic Relevance (Chomsky, 1955) for learning the idiom as a determinant. Once again, the variables that compose our data analysis come from state-of-the-art literature and they were three; the first was the reason why participants need to acquire knowledge of the language (Q1P1) – what is their main focus for L2 acquisition. The second variable was the linguistic difficulties they have with the idiom as it concerns grammar, oral or written skills and the third factor is how acceptance and adoption happened according to their Proficiency level.

For the Reasons category on why they need to study English, options ranged from professional aspects to personal leisure. Volunteers had options like travel, career, entertainment, post graduation course and other to choose. Those choices follow authors such as Bodnar et al (2014) who believe that "hobbies, interests, careers, and histories, their instruction can be personalized to sustain or enhance their motivation" (p. 181) or Wu (2015) that investigated how apps can "help college students to learn English (p. 1). The majority of Adopters and Potential Re-Adopters (63.4%) who downloaded and used the apps were focused on their professional careers as a motivation.

Taking into account the personal idiosyncrasies to the notion people have of what constitutes a "career", it is an overwhelming lead over Post Graduation which only accounted for 17 answers, 20.7% of responses. Setting aside the differences between the countries where the research was conducted (Brasil – Portugal) and the importance given to understanding English in each one of them, results confirm that English continues to be the lingua franca to the professional world in participants' eye. This is found in Table 6-9.

Table 6-9: D2 - Linguistic Relevance – Reasons to study English

	Travel	Career	Entertainment	Post Grad	Other	Total
Adopters	3	17	2	4	-	26
Potential Re-Adopters	5	35	3	13	-	56
Total 1	8	52	5	17	-	82
% of Acceptance **due to ...**	**9.8%**	**63.4%**	**6.1%**	**20.7%**	**0%**	100%
Quitters	1	14	2	3	2	22
Non-Installers	-	6	-	2	1	9
Total 2	1	20	2	5	3	31
Total 1+ Total 2	9	72	7	22	3	113

The other concept taken under the analysis for the Linguistic Relevance of adopting the apps was related to the difficulties participants recognized to have with the language. This inquiry came on Questionnaire 1 question 5 (Q1P5) entitled "*Which skill on the language do you have most difficulties with?*" We wanted to understand how apps would fulfill those difficulties and if volunteers found solutions to these hardships adopting and using the mobile environments. The alternatives to validate this assumption were: oral skills, writing skills, grammar and other (corresponding to a wide range of personal issues participants may possess). Having in mind the necessity of communication nowadays and the sheer importance of understanding Oral English, participants clearly recognized what Campos (2008), Rahimi and Katal (2012) observed about podcasts in English learning – comprehending this skill is fundamental to achieve oral persuasion. Lobato (2013) also focused on the need to reinforce listening skills to master language acquisition and stated that apps could be "uma atividade que visava o desenvolvimento das competências de audição e compreensão de enunciados orais produzidos por falantes de países de expressão inglesa" (p. 52).

The strength of such importance on listening has resonance with the previous "career-related" question, in special, to the conversational skills necessary on interviews (face-to-face or electronic) for job-hunters. Consequently, Oral Skills were responded by 48.7% of Adopters and Potential Re-Adopters as the ability they had difficulties contemplated through a lot of activities on the apps and these are valuable data to answer our objectives. Frequencies are displayed in Table 6-10 and a note to be

mentioned is the relevance of Grammar accounting for 25 responses or 30.4% in Adopters and Potential Re-Adopters. Therefore, Linguistic Relevance (D2) had a positive influence on Acceptance and Potential Adoption.

Table 6-10: D2 - Linguistic Relevance – Difficulties with the English Language

	Oral Skills	Writing Skills	Grammar	Other	Total
Adopters	16	1	8	1	26
Potential Re-Adopters	24	14	17	1	56
Total 1	40	15	25	2	82
% of Acceptance **due to ...**	**48.7%**	**18.4%**	**30.4%**	**2.5%**	100%
Quitters	8	3	8	3	22
Non-Installers	1	3	4	1	9
Total 2	9	6	12	4	31
Total 1+ Total 2	49	21	37	6	113

The third variable to determine a positive influence of Linguistic Relevance (D3) (Chomsky, 1955) on adopting the apps is the Proficiency Level revealed by participants on the test available at Q2P1-10. All graduates received a feedback via electronic messages informing about their Proficiency level in the Common European Framework of Reference for Languages (CEFR) but also in terms of how many correct answers they had out of the 10 questions; so the immediate feedback sent was delivered as A1 (1/10), A2 (3/10), B1 (5/10), etc. We opted for this feedback form since some of them may not be familiar with CEFR levels. After this proficiency feedback, they used the apps during the 3-month period and we collected the responses below afterwards.

Table 6-11: D2 - Linguistic Relevance – CEFR Proficiency Level and Acceptance after 60-90 days

Proficiency Level	Adopters	Potential Re-Adopters	Quitters	Non-Installers	Users	Percentage of Users
A0 (0/0)	-	1	-	-	1	0.9%
A1 (1/10)	-	2	-	-	2	1.8%
A2 (2/10)	3	3	-	-	6	5.8%
A2 (3/10)	5	9	4	2	18	17.4%
B1 (4/10)	2	10	1	2	13	12.6%
B1 (5/10)	2	6	2	2	10	9.6%
B1 (6/10)	4	4	2	2	10	9.6%
B2 (7/10)	4	7	5	-	16	15.4%
B2 (8/10)	4	7	5	-	16	15.4%
B2 (9/10)	2	5	2	1	9	8.7%
B2 (10/10)	-	2	1	-	3	2.8%
Total	26	56	22	-9	104	100%

What can be deduced from this result matches some of the observations done by the authors at the comparative analysis in subchapter 4.5. The five selected apps used in this study contemplated the needs of the participants in most of proficiency levels of the sample since we have five Adopters at level A2 (3/10), four each at levels B1 (6/10), B2 (7/10) and B2 (8/10). For Potential Re-Adopters, we had 10 individuals of level B1 (4/10), nine at the A2 (3/10) and seven each at B2 (7/10) and B2 (8/10).

These rates of adoption confirm that the mobile applications in this empirical study have their contents and human-computer interface (Dix, Finlay, Abowd and Beale, 2004) designed for different levels of language complexity. After informed of their proficiency level, sample subjects downloaded and used the mobile applications they personally decided for and that attended their linguistic difficulties and reason to study the idiom. High rates of Adopters and Potential Re-Adopters (82 participants total = 72.5%) confirmed graduates encountered on these very apps relevant opportunities for L2 acquisition and Determinant 2 had a positive influence. For future study, it could be assessed what made “Quitters”, from B2 (7/10) and B2 (8/10) for example, decrease the use and then abandon it. A little further on this subchapter, we explain which two apps have been used the most by our participants and a few reasons why.

When examining the next determinant to influence acceptance and adoption of the applications – Determinant 3, Hindering Conditions, we bring one of our original contributions as a PhD research. The trend in literature is to investigate "facilitating conditions" that generally help to develop adoption and obtain most of the time, adequate results. Academic literature points to fact there are not many studies on issues that impede adoption, generally because results of adverse perspectives are not well digested by peers; however, for the authors of this research it was worth an attempt. In this context, we inverted the semantical meaning of what is found in literature and included 'Hindering Conditions' as a determinant to our unified theory proposal (Venkatesh et al., 2003). We sought for those elements that disturb or hamper mobile learning even if it happens to people who adopted or potentially re-adopted this modality. In Table 6-12, we bring frequencies and percentages about the negative aspects in m-learning.

Based on Bartholo, Amaral & Cagnin (2009), Godwin-Jones (2011), Kukulska-Hulme (2005), Stockwell (2010), we selected features that were applicable to the issues in question. The alternatives were small screen, poor Internet connection, the approach of the methodology and an adequacy to personal preference with the "Don't Like" option. For 40.2% of adopters and potential re-adopters the negative aspect was the size of screens what comes in accordance to Ballard (2007), Dix, Abowd and Beale (2004), Lessa, (2013), Maniar, Bennett & Gal (2007) who all detected in the size of gadgets as one of the conundrums for mobile learning success.

Table 6-12: D3 - Hindering Conditions – Negative Aspect on learning with smartphones

	Small Screen	Poor Connection	Methodological Approach	Don't Like	Total
Adopters	12	12	2	-	26
Potential Re-Adopters	21	18	13	4	56
Total 1	33	30	15	4	82
% of Acceptance **even with...**	**40.2%**	**36.6%**	**18.3%**	**4.9%**	100%
Quitters	6	2	7	7	22
% of Quitters **due to**...	**27.3%**	**9.1%**	**31.8%**	**31.8%**	100%
Non-Installers	1	3	4	1	9
Total 2	7	5	11	8	31
Total 1+ Total 2	40	35	26	12	113

Poor Internet connection comes in second (36.6%) as a major hindering element with the majority of answers coming from respondents in Brazil, a country with more problems when it comes to broadband and Wi-Fi infra-structure than Portugal. These two factors alone demonstrate that Hindering Conditions have a strong and negative influence into the acceptance and adoption of apps, especially if we consider the frequencies among adopters and potential re-adopters confirming our assumption of Determinant 3 in our formulated UTAUT+M.

The unusual methodological approach in most of the applications was the third negative aspect pointed by 18.3% of potential users and personal preferences (Don't Like) corresponded to only 4 participants (4.9%) who may take back the use of apps. Since we are investigating conditions and aspects that hinder acceptance and adoption through this special determinant – Hindering Conditions – it is significant and mandatory to observe frequencies and percentages from participants who did not engage in adoption. The "Non-Installers", unequivocally, have not tried the apps but their opinions before the three-month period are still depicted in Table 6-12. The results that improve our analysis at this point are the frequencies of Quitters, participants who answered the question above as "Decreased/Quit" and responded to which hindering factor (Eickelmann, 2011; Pires & Costa Filho, 2008) was decisive for

the “disenchantment discontinuance” of usage (Rogers, 1983; Sahin, 2006; York & Turcotte, 2015).

Quitters amounted to 22 participants (19.4% of total sample) and 7 of these (31.8%) expressed a lack of attraction for the m-Learning modality answering “Don’t Like”. Personal preferences of students (Traxler, Barcena & Laborda, 2015) must not be judged by this study inasmuch it dealt with voluntarily adopting m-Learning environments. From Quitters, another seven (31.8%) asserted that the methodological approach was that main reason for abandoning the application. The concepts on what feels right as methodologies for English teaching (Finardi & Porcino, 2014) has a wide range of preferences and they were not contemplated according to these participants. Only two participants (9.0%) who did not continue using the apps elected poor Internet connection as the reason. At last, for 27.2% of Quitters (or 6 participants) the small size of smartphone screens was the decisive issue for discontinuance (Rogers, 1983) and coherent to our concept of negative aspects to D3. In Chapter 7, we further conclude this idea but rejection rates, content design and adaptation to overcome small screens should be the focus of Mobile-Assisted-Language-Learning theorists dealing with English language if they aim for more potential re-adopters.

The second element taken into account for the composition of variables to detect hindering conditions as Determinant 3 to the proposed UTAUT+M is also based on the literature of Rahamat et al. (2011), Venkatesh et al. (2003) and entitled Subjective norm in relation to ICT. Most cell phone owners make use of them in front of friends and peers and as subjective norms are always related to social issues, we decided to investigate how much embarrassment they feel when they express some lack of knowledge (Ajzen, 2002) with their smartphones in front of these very peers. This situation may hinder app usage as embarrassment generally leads to disenchantment or to discontinuance of the innovation according to Rogers (1983) or Sahin (2006).

Results demonstrated that adopters did not show embarrassment when faced with the situation proposed. As we can assess in Table 6-13, only 9.7% of adopters and potential re-adopters combined “totally agree” that embarrassment is a problem whereas a few more 14.6% “agree” that this is an issue. Taking the percentages of “Totally Disagree” (13.4%) and “Disagree” (33.0%) also as an indicator, we have 46.4% of participants that contradict the statement proposed therefore, we cannot consider

this aspect to be a fundamental hinder factor. According to literature in Venkatesh et al. (2003), Cheon et al. (2012), this embarrassment happens in much large scale if the use of technology is imposed and mandatory and where misuse (Sahin, 2006) has social or professional consequences. In Table 6-13 as well, it is possible to assess that Quitters followed the frequency distribution of other categories of adopters and do not present any anomaly. As a result, poor internet connection and the aforementioned screen sizes had more negative influence as Hindering Conditions and determinants (D3) to Acceptance and Adoption of mobile applications in this empirical study.

Table 6-13: D3 - Hindering Conditions – Embarrassment for lack of knowledge

	Totally Disagree	Disagree	Neutral	Agree	Totally Agree	Total
Adopters	3	9	7	3	4	26
Potential Re-Adopters	8	18	17	9	4	56
Total 1	11	27	24	12	8	82
% of Acceptance affected by Embarrassment	13.4%	**33.0%**	29.3%	**14.6%**	**9.7%**	100%
Quitters	3	9	6	3	1	22
Non-Installers	1	4	3	1	-	9
Total 2	4	13	9	4	1	31
Total 1+ Total 2	15	40	33	16	9	113

Performance Expectancy, Linguistic Relevance and Hindering Conditions are related to Technology Acceptance Model – TAM (Davis, 1989; Venkatesh et al., 2003) and belong to this theoretical perspective. We now introduce another contribution from our study, allocating theoretical concepts from Technology Readiness Index – TRI (Parasuraman & Colby, 2015; Souza & Luce, 2005) to work as one of the determinants (D4) for our UTAUT+M. Technology readiness for m-Learning (TR) was detected through an analysis of responses given by participants to the issue dealt on Q1P2, which accounted for the level of comfort graduates demonstrated using smartphones as a learning tool, respecting observations and concepts from authors like Bottentuit Jr (2012), Moura (2011) and Parasuraman (2000).

Options to participants ranged from Comfortable, Interested, Inclined toward and Challenging and were based on previous works in the area such as the ones developed by Alda & Leffa (2014), Costa (2013) and Dyson & Campello (2003). Frequency analysis and results exhibited by adopters and potential re-adopters amounted to a level of comfort that mirrors our current days of post-modernity – 65.9% (54 out of 82 individuals) responded on being comfortable to use their smartphones as a learning tool in the sense expressed by Godwin-Jones (2011), Marçal, Andrada & Rios (2005), Sha et al. (2012). A little less prone to use the smartphones to second language acquisition but still "Interested" in trying the mobile applications totaled 22 (26.8%) of the adopters and potential re-adopters came as seen in Table 6-14.

It is never crystal clear to the authors if the sum achieved represents comfort and readiness as a whole with their smartphones or comfort to use it for learning; an aspect that was overly emphasized during the live presentations of the questionnaires. Assuming they all understood the issue on the oral presentation; we have a promising future for MALL and a strong contribution to the positive influence of this variable on Determinant 4.

Table 6-14: D4 - Technology Readiness for m-learning – Level of comfort for smartphones as learning tools

	Comfortable	Interested	Inclined toward	Challenging	Total
Adopters	19	6	1	-	26
Potential Re-Adopters	35	16	3	2	56
Total 1	54	22	4	2	82
% of Acceptance due to Level of Comfort	**65.9%**	**26.8%**	**4.9%**	**2.4%**	100%
Quitters	11	4	7	-	22
Non-Installers	6	-	2	1	9
Total 2	17	4	9	1	31
Total 1+ Total 2	71	26	13	3	113

The second variable to determine the Technology Readiness level of volunteers was assessed via another Likert-scale question that graded levels of agreement to the sentence on Q3P7 entitled: "Content of classes could be delivered online and teachers

would have the role of coaches or mentors". This assumption is based on fiery academic debates whether teachers are being replaced by new technologies (Kukulska-Hulme et al., 2011; Silva et al., 2014) or what is the new role of instructors on the redesign educational institutions are being forced to embark (Cardoso, Tavares & Sin, 2015; Oblinger, 2006). Participants already understand that content is not a domain of professors and most of it can be found online; the real change is for university professors to assume this new paradigm as a mentors or coaches in classroom discussions (Martins, 2015). After all, do participants have enough technology readiness for a new paradigm of instructional theories (Koole, 2009) such as this? What we analyzed in this study is this fact for adopting a SLA mobile application; the answers reflect that acceptance of online content delivery is high and future studies have a large horizon of research questions to contemplate. Table 6-15 below exemplifies the level of agreement demonstrated on this research sample.

Close to half of potential re-adopters responded "agree" (45.1%) that content delivery may happen via electronic format and 13.4% of the 113 individuals (11 participants) "totally agree" with that alternative, signaling they are ready. Setting aside the reality of this issue inside university classrooms nowadays, it is recommended to observe what is presented through the apps and their communicative competences. Hence, Determinant 4 had a positive influence on our Adopters and Potential ones.

Table 6-15: D4 - Technology Readiness – Online content delivery and teachers seen as a coach or mentor

	Totally Disagree	Disagree	Neutral	Agree	Totally Agree	Total
Adopters	3	5	3	11	4	26
Potential Re-Adopters	-	9	14	26	7	56
Total 1	3	14	17	37	11	82
% of Acceptance due to Online Content	3.7%	17.1%	20.7%	**45.1%**	**13.4%**	100%
Quitters	-	1	7	11	3	22
Non-Installers	-	2	3	2	2	9
Total 2	0	3	10	13	5	31
Total 1+ Total 2	3	17	27	50	16	113

Yet to ponder over this Table 6-15 and its frequencies and percentages, we obtained 20.7% of participants with neutrality to this issue of content delivery (Cortez & Roy, 2012; Schofield, Sackville & Davey, 2006) and a 20.6% of individuals, adding the answers from "totally disagree" and "agree", contrary to this new pedagogical innovation (Evans, 2009) or practice (Anderson & Shattuck, 2012; Straub, 2009).

On to the next Determinant to be detailed in this statistical analysis, D5 – Voluntariness of Use, it was observed the volitional adoption of users in a correlation with the Available Time for learning (Kukulska-Hulme, 2012) expressed by participants on Questionnaire 1 – P4. The authors decided for time available for study (Picciano, 2002) since it is considered an asset for everyone and used an allegation for drop out reasons in English courses. University students have a timetable hard to cover and "mobile devices are utilized to make it possible for individuals with busy schedules to learn at their preferred places and times" (Park, 2014, p. 92). We established four options for participants inquiring if they had 2h, 4h, 6h or 8h hours a week available to make use of the applications. Voluntariness of use is an important component in a decision to include any new technology or innovation into someone's routine and "essential to understand the influence of the major constructs on the user intention of technology adoption" (Shorfuzzaman & Alhussein, 2016, p. 3). The availability of participants was assessed as seen in Table 6-16 below.

Table 6-16: D5 - Voluntariness of Use – Time available per week to use the apps

	2h	4h	6h	8h	Total
Adopters	12	9	3	2	26
Potential Re-Adopters	20	17	8	11	56
Total 1	32	26	11	13	82
% of Acceptance due to Time per week	**39.0%**	**31.7%**	13.4%	15.9%	100%
Quitters	11	8	2	1	22
Non- Installers	5	1	1	2	9
Total 2	16	9	3	3	31
Total 1+ Total 2	48	35	14	16	113

Not surprisingly, two hours a week (39.0%) and four hours a week (31.7% of participants) were the two most selected options; a confirmation to the aspect of hectic lives most of participants lead. As mentioned on literature review, bite-sized learning (Chinnery, 2006; Agulló & Vallejo, 2015; Hoy, 2011; Traxler, 2013) found in most apps for SLA supplies time shortage for learning, however methodological approaches are sometimes educationally limited (Traxler, Barcena & Laborda, 2015). Even so, it may fit to the needs users demonstrated with the language in "easily chewable chunks of information" (Hoy, 2011, p. 90).

The other variable put in place to verify the positive influence of Determinant 5 – Voluntariness of Use (VU) to the acceptance and adoption is also related to time and maintains coherence (Schofield, Sackville & Davey, 2006) to the determinant analysis in Cortez & Roy (2012), Eduardo, Oliveira, & Lima (2015), Fallows & Bhanot (2005) and Oliveira (2004). The statement was concerned with the flexibility of schedules and a personal adaptation to an already mentioned occupied timetable. We asked participants to react to the statement on Questionnaire 3, P3: *"I like studying online because I am not restrained by regular class schedules."* As a rate of agreement, opinions of participants here may reflect that moment in the semester they survey was performed, not an overall decision for life but we took this for granted on our analysis and conclusions. Moreover, this preference may also be affected by the topic or subject involved in the m-Learning activity per se but "learners will not have to wait for a certain time to learn or go to a certain place to learn" (Agulló & Vallejo, 2015, p. 81).

Responses are displayed in Table 6-17. Neutrality was presented by 37.8% of participants what explains the level of familiarity (Kondo et al., 2012) this concept already has in their minds. Had this assumption been asked twenty years ago, Neutral answers probably would differ significantly. For 25 potential re-adopters (30.4% of sample) there was an agreement to this proposal and there were 16 individuals (19.5%) who "totally agreed" with the statement, what may be interpreted as a requirement.

Table 6-17: D5 - Voluntariness of Use – Not limited to regular schedules of classes

	Totally Disagree	Disagree	Neutral	Agree	Totally Agree	Total
Adopters	1	4	9	8	4	26
Potential Re-Adopters	-	5	22	17	12	56
Total 1	1	9	31	25	16	82
% of Acceptance due to Flexible Schedules	1.2%	11.0%	37.9%	**30.4%**	**19.5%**	100%
Quitters	-	1	5	7	9	22
Non-Installers	1	2	1	5	-	9
Total 2	1	3	6	12	9	31
Total 1+ Total 2	2	12	37	37	25	113

The ones who still prefer to have classes in regular schedules and according to which has been done for decades amounted to just 12,2% of adopters and potential re-adopters so we may deduce participants are ready for this and would like to have more volitional control of their learning experiences.

The next determinant, D6 was originated from Innovation Diffusion theory by Rogers (1983) and composed of a variable entitled Knowledge & Persuasion (KP). It analyzed responses that expressed a feedback from the live presentations all participants watched at UNL or at UNIT. Respondents answered to question 2 available at Questionnaire 4 which read: *"How do you rate the live presentation of the research and of the applications' features ?"* The nature of the questioning is once again based on literature such as Rogers (1983), Sahin (2006) and Straub (2009) who detailed the importance of these two stages in diffusing an innovation. As recommended, we selected two options of positive feedback and two of negative feedback (Blake, 2008;

Rogers, 1983) to avoid participants having a "neutral" positioning and express in a objective form how they felt after this once encounter. We only met students at this opportunity and every contact made after this moment was electronic, via email or whatsapp messages.

Results show a massive positive feedback since 58.5% considered the presentation as Stimulating and the ones who believed our live talk was Adequate counted for 31.7%. When combined, these two percentages account to a staggering 90.2 % of approval (74 out of 82 participants). Two comments to close this segment of Determinants 6 of our formulated UTAUT+M (Knowledge & Persuasion) and relevant to mention: the first is that even participants who considered the explanation Complex or Confusing are among the potential re-adopters of the apps so we may imply those live encounters resulted in Acceptance (Moore & Benbasat, 1991); and confirmed that Determinant 6 had a positive influence on our UTAUT+M.

The other aspect concerns the Quitters which 100% of them considered KP as Adequate and Stimulating; therefore, knowledge stage (Rogers, 1983; Sahin, 2006) cannot be blamed for their disenchantment with the mobile applications (Rogers, 1983; York & Turcotte, 2015) as seen in Table 6-18.

Table 6-18: D6 - Knowledge and Persuasion – opinion on the live presentation

	Complex	Confusing	Adequate	Stimulating	Total
Adopters	3	-	9	14	26
Potential Re-Adopters	4	1	17	34	56
Total 1	7	1	26	48	82
% of Acceptance to opinion	8.5%	1.2%	**31.7%**	**58.6%**	100%
Quitters	-	-	16	6	22
Non-Installers	-	-	6	3	9
Total 2	0	0	22	9	31
Total 1+ Total 2	7	1	48	57	113

Determinant 7, Acceptance and Adoption of the applications is the overall result of the previous determinants combined inasmuch as the result of which mobile applications were downloaded (Gillespie et al., 2007; Wu, 2015) and used during the

60-90 days period by Adopters (whose responses were “The Same/Increased) and Potential Re-Adopters (the ones who answered to questionnaire 4 with “Decreased/Retake”). We came to the final numbers correlating the variables (Creswell, 2012) of these responses for Adoption and Potential Re-Adoption to the ones given by Quitters and Non-Installers to determine the Rate of Rejection. Nonetheless, to gather these last statistics it was relevant to assess Acceptance and Adoption that occurred in each of the five selected mobile applications likewise the final figures by Gender and by University, producing a sheer scope of our investigative work. We return to D7 in the end of this segment.

To understand how each mobile application was accepted by the sample (Venkatesh et al., 2003), we outlined an analysis on how the acceptance and adoption of the application happened detailing the total of downloads (Traxler, 2013), total of users and number of quitters. It was also verified the rate of adoption, potential adoption among the 113 participants and the rate of rejection (Ahmad, 2014; Ferreira et at., 2012; Rogers, 1983) within the downloaders of that specific app itself and finally, the acceptance rate (Davidson Wolf, 2011) the mobile application had among the total sample of the study. It is necessary to inform that we had a total 129 downloads as some individuals tested and used more than one app on their smartphones.

Starting with the least adopted app – Speak English Daily, it revealed bad acceptance rates (Davidson Wolf, 2011) as it only had 3.8% of the total downloads among the five selected mobile applications as in Table 6-19 below. Five participants tested and used the app but only one (1 out of 113) adopted it, totaling 0.8% to the Rate of Adoption (Sahin, 2006). The two Potential Re-Adopters that planned to retake the use of the application amounted to 1.7%. Since we also had 2 persons (out of 5 downloaders – 3.9%) discontinuing the use of the application, this discontinuance (Rogers, 1983; Sahin, 2006; Venkatesh et al., 2003) represented a 40% Rate of Rejection among this app users. In the end, Speak English Daily only had a 2.9% Rate of Users (Stald et al., 2014) as in three participants out of the users sample (N=104) which does not include Non-Installers. As a final observation, the fact that no males downloaded or tested this application during the trial.

Table 6-19: Speak English Daily application – Participants and percentages after 60-90 days

Speak English Daily	F	M	Total	Acceptance (A)+(PR), Rejection (R), Downloads (D) and Users (U)
Adopters	1	-	1	0.8% (A)
Potential Re-Adopters	2	-	2	1.7% (PR)
Quitters	2	-	2	40% (R)
Total Downloads (out of 129)	5	-	5	3.9%(D)
Total of Users (out of 104)	3	-	3	2.9% (U)

Continuing to the next application under analysis in Table 6-20 below, Babbel presented relatively better numbers and percentages for acceptance (Venkatesh & Bala, 2008) as it stood with a total of 26 potential users (25.0%) (Stevenson & Liu, 2010) which included 6 adopters out of them (5.3%). Twenty individuals planned to use the app again which accounted for 17.6% of the total sample. Eight individuals (out of 34) discontinued its use (Rogers, 1983) after downloading the app and this fact represented a 23.5% rejection (Venkatesh et al., 2003) among Babbel testers. The application accounted for thirty-four among the 129 total of downloads (Traxler, 2013), representing 26.4%. As last information, Adopters and Potential Re-Adopters of Babbel made it the second most adopted application on this doctoral investigation. On the comparative analysis found on sucbchapter 4.5 of this work, some of the features that may have caused this result are specified and on conclusions we suggest a topic for future study that may take adoption even further.

Table 6-20: Babbel application – Participants and percentages after 60-90 days

Babbel	F	M	Total	Acceptance (A)+(PR), Rejection (R), Downloads (D) and Users (U)
Adopters	3	3	6	5.3% (A)
Potential Re-Adopters	12	8	20	17.6% (PR)
Quitters	7	1	8	23.5% (R)
Total Downloads (out of 129)	22	12	34	26.4% (D)
Total of Users (out of 104)	15	11	26	25.0% (U)

The next application with frequencies checked is British Council in Table 6-21 below next, and whose end-users (Gu, Gu & Laffey, 2011; Kurtz et al., 2015) presented a rate of adoption of 1.7% with only two individuals making constant use of it. 7.9% of participants consider retaking it for English learning, totaling 9 Re-Adopters. Rejection was high for this mobile application with 7 people out of the eighteen initial users dropping out before the 90th day of the experience (Stald et al., 2014), accounting it for 38.8%. The number of mobile downloads for this application (Traxler, 2013) was 18, representing 13.9% out of the 129 total. The negative acceptance (Davis, 1989) comes from the fact that 7 (out of 18) discontinued its use and took Rejection rate to 38.8% of downloaders. Finally, we may establish that British Council had a Rate of Users of 10.6% of participants as seen inTable 6-21.

Table 6-21: British Council application – Participants and percentages after 60-90 days

British Council	F	M	Total	Acceptance (A)+(PR), Rejection (R), Downloads (D) and Users (U)
Adopters	1	1	2	1.7% (A)
Potential Re-Adopters	5	4	9	7.9% (PR)
Quitters	6	1	7	38.8% (R)
Total Downloads (out of 129)	12	6	18	13.9%(D)
Total of Users (out of 104)	6	5	11	10.6% (U)

The next mobile application analyzed is Busuu, where we could assess that only three individuals really adopted the app (Bottentuit Jr, 2012; Rogers, 1983)

representing 2.6% in Adopters as seen in Table 6-22 below. The learners who plan to reuse the application back were eleven, and these Potential Re-Adopters (Ahmad, 2014; Sahin, 2006) accounted for 9.7% of the study sample. The rate of Rejection based on the discontinuance (Pires & Costa Filho, 2008) was 22.2% with 4 Quitters out of eighteen downloads in total. As mentioned, Busuu had 18 downloads (Hoy, 2011; Traxler, 2013) in relation to the 129 total downloads in the study corresponding to 13.9%. For the overall understanding of how Busuu application was accepted by these research partakers, we concluded appointing it was used by fourteen graduates, 13.5% of the sample as in Table 6-22.

Table 6-22: Busuu application – Participants and percentages after 60-90 days

Busuu	F	M	Total	Acceptance (A)+(PR), Rejection (R), Downloads (D) and Users (U)
Adopters	3	-	3	2.6% (A)
Potential Re-Adopters	6	5	11	9.7% (PR)
Quitters	2	2	4	22.2% (R)
Total Downloads (out of 129)	11	7	18	13.9%(D)
Total of Users (out of 104)	9	5	14	13.5% (U)

Getting to the most used application in the study – Duolingo, we evaluated statistics and frequencies in Table 6-13 below and it has shown the potential of this mobile application to supply demands of learners (Jarvis, 2008; Kumaravadivelu, 1994; Sharples, 2000). A 15.9% rate of adoption (the highest) can assess that with 18 participants becoming Adopters of the mobile application. As for the individuals who plan to reuse (considered Potential Re-Adopters) we had 27 partakers fitting into this category (23.8%). Total of downloads was also higher that any other application and accounted for 54 ones – a relevant 41.9%. From these 54 downloaders, only 9 decreased their use and quitted the app what conducted the rate of rejection (Rogers, 1983; Sahin, 2006) to a 16.6%, the lowest among all five apps. In the end, total of users accounted for 45 people corresponding to 43.2% of the 104 app users in the investigation as in Table 6-23.

Table 6-23: Duolingo application – Participants and percentages after 60-90 days

Duolingo	F	M	Total	Acceptance (A)+(PR), Rejection (R), Downloads (D) and Users (U)
Adopters	9	9	18	15.9% (A)
Potential Re-Adopters	12	15	27	23.8% (PR)
Quitters	4	5	9	16.6% (R)
Total Downloads (out of 129)	25	29	54	41.9%(D)
Total of Users (out of 104)	21	24	45	43.2% (U)

After these individual tables for each of the applications, we concluded the analysis of the apps on a comparative analysis on how each one was accepted, adopted or rejected (Ahmad, 2014: Marçal, Andrade & Rios, 2005; Rogers, 1983; Venkatesh et al., 2003) as well as the number of downloads and users they gathered. The Table 6-24 below delineated information to explain Acceptance and Rejection of the mobile applications and portrayed Duolingo as the most accepted (Venkatesh et al., 2003) app in the study answering the second of our Research Questions proposed.

Duolingo had 15.9% of Adopters and 23.8% of Potential Re-Adopters, totaling 39.7% of acceptance. It also showed the lowest rate of Rejection with 16.6% below average of 28.2%. It accounted to 41.9% of all downloads (Godwin-Jones, 2011; Traxler, 2013) and 43.2% of all app users in the study. As reinforcing Duolingo numbers, the second most used application in the investigation was Babbel, displaying 5.3% of Adopters and 17.6% of Potential Re-Adopters in a total of 22.9% of acceptance; rate of Rejection reached 23.5% which was also below average; total downloads reached 26.4% and the total of users came to 25%, one in four users.

Table 6-24: Rate of Acceptance (A)+(PR), Rejection in average (R), Downloads (D) and Users (U) in percentages

	Speak English Daily	**Babbel**	British Council	Busuu	**Duolingo**
Adopters (A)	0.8%	**5.3%**	1.7%	2.6%	**15.9%**
Potential Re-Adopters (PR)	1.7%	**17.6%**	7.9%	9.7%	**23.8%**
Acceptance (A) + (PR)	2.5%	**22.9%**	9.6%	12.3%	**39.7%**
Rejection (R) among users who downloaded each app	40%	**23.5%**	38.8%	22.2%	**16.6%**
Downloads (D)	3.9%	**26.4%**	13.9%	13.9%	**41.9%**
Users (U)	2.9%	**25.0%**	10.6%	13.4%	**43.2%**

Moving from the analysis of the mobile applications to the participants, the final determinant – Determinant 7 is the refusal (Davidson Wolf, 2011) of the acceptance and adoption (Pires & Costa Filho, 2008; Rogers, 1983; Venkateh et al., 2003) and corresponded to the values and percentages established by Quitters and Non-Installers after the 60-90 days. It helped to define and answer the first of the research questions proposed – if participants accepted and adopted (Rogers, 1983; Venkatesh et al., 2003; Venkatesh & Bala, 2008) the mobile applications aimed at Second Language Acquisition understanding them as learning tools (Adelina & Carvalho, 2011; Park & Slater, 2013). As it was established in the beginning of this Chapter, the result of all six UTAUT+M determinants (Akbar, 2013; Martinho, 2014; Pires & Costa Filho, 2008; Van Raaij & Scheppers, 2008) acting in alignment have a positive influence and generate Acceptance for the Adoption of the mobile applications.

In Table 6-25 below, we illustrated the rates of the acceptance and rejection by gender. Females were 65 individuals whose fifteen of them became Adopters (Stald et al., 2014; Venkatesh & Bala, 2008) of the apps corresponding to 23.05% and 30 responded that would retake the application again accounting for 46.15% of the women. These two categories added (Adopters and Potential Re-Adopters) represent 69.2% of the women in the study. The other 30.8% of the females were among the Rejection rates (Dias et al., 2011; York & Turcotte, 2015) where 23.05% corresponded to Quitters (15 individuals) and the Non-Installers were 7.75% accounting for 5 women as seen in Table 6-25 below, with values and percentages that influenced Determinant 7.

For the men, acceptance rates were also on a positive note. Adopters were 22.91% and amounted to 11 men while Potential Re-Adopters corresponded to 54.19% in a horizon of 26 lads. Both categories added take acceptance of smartphones as a learning tool (Venkatesh et al., 2003; Venkatesh & Bala, 2008) among men to a comfortable 77.1% of this study. Quitters were 7 individuals (14.58%) who refuted (Davidson Wolf, 2011) the idea and Non-Installers comprised only 4 people (8.32%) and both categories added took Rejection rates to 22.9% and are in D7. With these data, it is possible to say that the majority of women and men in this empirical study accepted concepts of using their smartphones as tools for second language learning (Blake, 2008; Costa, 2013; Traxler, Barcena & Laborda, 2015) as seen in Table 6-25.

Table 6-25: Rate of Acceptance and Rejection by Gender. Number of participants and percentages

	F	Rate of Acceptance	M	Rate of Acceptance
1 – Adopters	15	23.05%	11	22.91%
2 – Potential Re-Adopters	30	46.15%	26	54.19%
Total 1+2	45	**69.2%**	37	**77.1%**
-	**-**	Rate of Rejection	**-**	Rate of Rejection
3 – Quitters	15	23.05%	7	14.58%
4 – Non-Installers	5	7.75%	4	8.32%
Total 3+4	20	**30.8%**	11	**22.9%**
Total of Participants	65	100%	48	100%

Next on the assessment of results and participation on Table 6-26, we produced an analysis over the percentages and quantities of Adopters and Potential Re-Adopters by University to create a perspective of how different institutions and courses reacted to the study. Quitters and Non-Installers are also included on the data likewise, so we could understand a little further Determinant 7 and which answers could be extracted from this PhD investigative work. The first correlation we verified was that Biomedicine had the lowest average in the proficiency level test (4.3 out of 10) before the three-month trial (Freitas, 2004; Suwantarathip, 2015) and the highest rate of acceptance after the 90 days of use.

Thirty-two UNIT Biomedicine graduates participated at the research and 30 accepted the mobile apps (Venkatesh et al., 2003; Sahin, 2006). Ten of these graduates became Adopters and the remaining 20 entered to the category Potential Re-Adopters taking the Acceptance rate to a staggering 93.7% of all graduates in this course. Biomedicine had only two Non-Installers corresponding to 6.3% of Rejection in the course.

Petroleum Engineering graduates at UNIT were 30 participants where 5 became Adopters and 16 finished the trial as Potential Re-Adopters. These two categories amounted to 21 individuals representing 70% of acceptance of SLA mobile learning by these future engineers. From this same course, 4 graduates quit the apps and five did not install any application (the highest value among courses) totaling 9 individuals who rejected the idea and totaling Rejection (D7) in 30%. Also from UNIT, English Language had twenty-six graduates and presented a 76.4% Acceptance rate with 9 students adopting the apps and 17 potentially re-adopting them soon (Waters, 2009). The rate of Rejection for the future English teachers was 23.6% with seven Quitters and 1 Non-Installer as influencers to Determinant 7.

The last university analyzed in the table was UNL which presented numbers totally opposed to the Brazilian university. Portuguese graduates from Universidade Nova de Lisboa were seventeen in total but only two became Adopters of the apps and 3 revealed plans to re-adopt them in a short period of time; this reflected in the worst rate of acceptance in the study – only 29.4%. The other 70.6% of the UNL participants corresponded to the 11 Quitters (the highest value) and only one Non-Installer in the group. The reasons for this bad acceptance of the SLA apps may be a product of the internationalization level of UNL where students already know the language and did not see relevance in using the mobile applications; recording that most of the applications have their bulk of activities aimed at basic and intermediate levels. Or we may deduce that Portuguese graduates corresponded to the excellent position the country stands concerning English language proficiency levels – 13th in the world according to 2015 Education First English Proficiency Index (EF). We assessed this issue further on conclusions.

Table 6-26: Rate of Acceptance and Rejection by University/Course. Number of participants and percentages

	UNIT Biomedicine	UNIT Petroleum Engineering	UNIT English Language	UNL FCT + Ilnova	Total
1 – Adopters	10	5	9	2	26
2 – Potential Re-Adopters	20	16	17	3	56
Total 1+2	30	21	26	5	82
Rate of Acceptance	**93,7%**	**70%**	**76,4%**	**29.4%**	**72.5%**
3 – Quitters	-	4	7	11	22
4 – Non-Installers	2	5	1	1	9
Total 3+4	2	9	8	12	31
Rate of Rejection	**6.3%**	**30%**	**23.6%**	**70.6%**	**27.5%**
Total of Participants	32	30	34	17	113

After the analysis by app, gender and university course, on the next page Table 6-27 presented the Results that disclosed how variables and determinants of our UTAUT+M worked to generate a positive influence in the Acceptance and Adoption of smartphones to MALL and also how Rejection affected this acceptance process. All percentages in Table 6-27 (except the last - Rejection) are the sum of Adopters and Potential Re-Adopters answering to the questions proposed and choosing the attribute specified on the table. For Determinant 1, Performance Expectancy of participants was expressed in the rates establishing Own Rhythm of studies (Kukulska-Hulme, 2009; Martins, 2015; Teles, 2013) as the major advantage (for 47.5%) as well as the agreement to the statement concerning that learning productivity enhances when ICT is involved in education (Hargreaves, 2003; Joseph, Corbeil & Valdes-Corbeil, 2007) which reached 62.2%; and both demonstrated the positive influence of these two attributes to adoption of mobile applications as it is formulated in our UTAUT+M. It went along with the ideas of Kukulska-Hulme (2009) that when second language learners have their own pace of acquisition results are better in L2 learning. For Zhang (2012), productivity tools such as smartphones and tablets on the hand of users have to wait until people find their comfort zone and results generally come after.

As for Determinant 2, Linguistic Relevance is based on the concepts of Chomsky (1955) for linguistic competence as mastering the language in its many social functions

and it was perceived that linguistic relevance for using the apps was connected to the professional careers of participants as it is seen on results. Adopters and Potential Re-Adopters rated this attribute 63.4 %, what seems reasonable as the research was held inside universities and graduates are thinking about their close future as workers entering the labor market.

Table 6-27: Variables, Determinants, Rates and Attributes

Variables	Determinants	Rates	Attributes
Advantages - smartphones for learning	D1/PE	47.5%	Own Rhythm
Educational Productivity w/ ICT	D1/PE	62.2%	Agree
Reason to study English	D2/LR	63,4%	Professional Career
Difficulties with English	D2/LR	48.7%	Oral Skills
Proficiency Level / Higher Acceptance	D2/LR	17.4%	A2 (3/10) – 18 participants
Negative Aspect - smartphones for learning	D3/HC	67.5%	Small Screen
Embarrassment for lack of knowledge	D3/HC	33.0%	Disagree
Level of comfort - smartphones for learning	D4/TR	65.9%	Comfortable
Online Content Delivery	D4/TR	45.1%	Agree
Available time per week	D5/VU	39.0%	2 hours
No regular class schedule	D5/VU	30.4%	Agree
Opinion about live presentation	D6/KP	58.6%	Stimulating
#1 Most Used Application	D7/AA	39.8%	Duolingo
#2 Most Used Application	D7/AA	22.9%	Babbel
Acceptance of Apps after 60-90 days	D7/AA	72.5%	Adopters + Potential Re-Adopters
Rejection of Apps after 60-90 days	D7/RJ	27.5%	Quitters + Non-Installers

The second most relevant issue concerned Determinant 2 (Linguistic Relevance for using the SLA mobile applications in smartphones) was the difficulty participants felt or still feel with the English idiom: be it grammatical, about listening to the language or writing it. For 48.7% of the ones who accepted and used the mobile apps, Oral skills is the question of difficulty. The m-Learning applications suggested in this study covered these aspects reasonably as values and percentages analyzed beforehand could confirm. After the 90 days, almost half of the participants were using it due to the activities that cover this skill.

The third attribute for D2 in our UTAUT+M was the proficiency test all users were submitted and received feedback. We had A1, A2, B1 and B2 CEFR levels among the partakers and the largest group was A2 (3/10) with 18 individuals. Unfortunately, we could not submit them to another test in the end of trial due to tight schedule deadlines imposed by Erasmus to this research. Nevertheless, our prime objective in applying the proficiency test as a placement exam was to perceive students' difficulties with different areas of the language. At last, the exam and immediate feedback also worked as a form of creating intrinsic motivation on participants (Bodnar et al., 2014; Davis, 1989) for this MALL experience.

The next determinant evaluated on the Table 6-27 above is D3 which presents our original contribution as a PhD research in observing the Hindering Conditions (Eickelmann, 2011) of accepting and adopting innovation in technology (Akbar, 2013; Ferreira et al., 2012; Martinho, 2014; Van Raaij & Scheppers, 2008; Venkatesh & Bala, 2008). We casted some elements that may hinder the use of smartphones to learn English and the size of the screen was chosen by 27.3% of Quitters what explains why they discontinued (Rogers, 1983; Sahin, 2006) their m-Learning practice (Kukulska-Hulme, 2009; Wu, 2015). However, 40.2% of Adopters and Potential Re-Adopters also chose this element whilst it did not affect their acceptance; it was implicit on the definition of our results that small screens are a major issue affecting m-Learning as 67.5% of partakers agree with that.

Also composing Determinant 3 is the concept of Subjective Norm, where we measure how social influence of peers or co-workers affects the adoption or rejection of technology innovation. As most literature in Bobsin, Vicentini and Rech (2009), Fishbein and Ajzen (1975), Park (2009), Venkatesh and Davis (2000) has examples on the subject, friends and co-workers possess strong social influence over people's decision to adopt or not some innovation. In the UTAUT+M, our interest was if there is any embarrassment for the user if he/she demonstrates lack of knowledge (Ajzen, 2002) with smartphones in front of friends. As Rogers (1983) stated, discontinuance of use has many reasons and subjective norms when imposed is one of them. In our research, this variable was disagreed by 33.0% of the Adopters (9 individuals) and Potential Re-Adopters (18 partakers) combined. Consequently, we cannot consider it a hindering

factor (Eickelmann, 2011) so, for this study, Hindering Conditions have to be mostly perceived by the aspect of screen size or methodology more than anything else.

Yet on the results expressed in Table 6-27 above, we then discussed Determinant 4, the one encompassing aspects of Technology Readiness (Parasuraman & Colby, 2015; Pollara, 2011; Souza & Luce, 2005) and the level of comfort participants had in using their phones to perform mobile assisted language learning. For adopters and potential re-adopters in this empirical study, we had 65.9% of these respondents clicking on the answer "I feel comfortable" which can be translated into individuals in the study are ready and responded to our objectives for m-Learning (Elliott, Hall & Meng, 2008), a fact that requires pondering from educational analysts from now on. On this small sample, percentages and values represent a university reality of a determined social class but results done under some other similar circumstances (Cheon et al., 2012) show rates on a positive note.

The other variable involved in Determinant 4 was assessed in an agreement Likert-scale (Moura, 2014) where participants reacted to the possibility of receiving content via online and the role of teachers would be altered to new parameters (Eickelmann, 2011). Adopters and Potential Re-Adopters reacted positively with 45.1% 'agreeing' to the statement and the answer 'totally agree' receiving 13.4% of answers. Participants were not asked whether teachers' role should be of mentors, coaches, mediators, entertainers, monitors, facilitators or communicators (Bax, 2003; Jurkovič, 2006) as literature has presented.

To D5, Voluntariness of Use, we tried to understand the volitional control (Ferreira et al., 2012; Pintrich, 2004; Zimmerman, 2008) in relation to available Time as an attribute in the variable. We questioned participants how many hours a week they could use the selected applications and how they felt about having flexible schedules (Park, 2014) to learn a language since this is one of the advantages mobile apps provide in second language acquisition. Answers varied but 2h a week (39.0%) and 4h a week (31.7%) were the most selected slots and we may comprehend it two perspectives. First, participants do have available time to study; not too many hours, though. And second, the bite-sized format (Chinnery, 2006; Hoy, 2011) found on lessons available in most mobile applications respond to the needs of fast units with small chunks (Hoy, 2011) of lessons. The second attribute of D5, if flexibility of time would be an asset to

English learning, 30.4% of Adopters and Potential Re-Adopters (35 people) agreed to that and the ones who answered 'totally agree' corresponded to 19.5% of the same group. Flexibility of schedules can be translated for independence (Wang & Young, 2014) and the "anytime-anywhere feedback" present on the applications has been attractive to millennials (Jarvis, 2001).

Moving to Determinant 6, Knowledge and Persuasion are two concepts based on the Innovation Diffusion Theory (Rogers, 1983) and that refer to an important phase before an innovation is tried. To understand the features and advantages of a new technology, most people prefer to receive some briefing information about it and then risk an attempt. We adapted our research to these aspects and delivered live presentations of the apps and the objectives of the research. D6 verified how participants understood presentations and rated choosing from two positive attributes and two negative ones. 58.6% of Adopters and Potential Re-Adopters combined clicked on "Stimulating" as an opinion for these live talks whereas 31.7% of the same group chose "Adequate" to express how they evaluate the encounters. Ergo, we can say that the applications' features and research aims were delivered.

We close the Determinants analysis with D7, summarizing what the study was concerned and its last results. D7 corresponded to the rejection that is generated from the absence of acceptance and adoption to the apps. Verifying adoption, among the 113 participants of the study, we ended the 60-90 days period with 23.5% of women (15) and 22.91% of men (11) on the Adopters category – 26 individuals. Potential Re-Adopters were 46.15% of women(30) and 54.19% of men (26) amounting to a total of 56 individuals. Adding both for a better grasp of the final numbers; women finished the research with 69.2% of acceptance and men with an interesting 77.1%. These rates were fundamental to answer our first research question on next Chapter 7.

Rejection is dictated by the Quitters and Non-Installers. For those who discontinue the use of the apps after installing them (quitting m-learning) we had 15 women (23.05%) and 7 men (14.58% of the men); a total of 22 abandonments. Non-Installers were 9 only in total with 5 women never trying an application (7.75%) and 4 men who said no to m-Learning (8.32%). So, rejection among women represented 30.8% and among the men it closed in 22.9%.

Concerning the second research question that investigated which application can be recommended for curricular developments inside higher education institutions we dedicated Chapter 7 to that explanation; however, it is worth mentioning here that Duolingo and Babbel had results of acceptance that recommend their use. Duolingo had 15.9% of Adopters and 23.8% of Potential Re-Adopters, totaling 39.7% of acceptance. It also showed the lowest rate of Rejection with 16.6% which was certainly below average of 28.2%. It accounted to 41.9% of all downloads (Godwin-Jones, 2011; Traxler, 2013) and 43.2% of all app users in the study. The second most used application in the investigation was Babbel, displaying 5.3% of Adopters and 17.6% of Potential Re-Adopters in a total of 22.9% of acceptance; rate of Rejection reached 23.5% which was also below average; total downloads reached 26.4% and the total of users came to 25%, one in four users.

7 Conclusions

7.1 Answers to Research Questions

After the statistical analysis and presentation of the results, we gathered this information and outlined the Conclusions to the study. As the study is qualitative in method with some quantitative analysis and since the sampling was on convenience, the results cannot be generalized beyond this study and allow for the deeper understanding. We started addressing the Research Questions in correlation to responses and results to the formulated nomological network UTAUT+M and its determinants and variables. Percentages on questionnaires demonstrated the acceptance and readiness to adopt Second Language Acquisition applications by participants who perceived the apps as learning tools to SLA. We then included a holistic analysis relating responses to Connectivism, MALL, volitional control, the new role of the teacher and the learner, BYOD and the linguistic competence experienced by them through hands-on mobile assisted language learning.

As established in Chapter 6 (Results), we considered this acceptance of the applications divided into two categories: the Adopters – their use increased or kept the same as started; and the Potential Re-Adopters – participants who decreased their use but intend to take back to the apps again. Regarding these conclusions, this separation is re-established from now on.

In **Research Question #1** about the aspect to the acceptance and adoption of apps, our first conclusion addressed the gender issue in the study where Women Adopters had a slightly higher rate – 23.05% than Adopters from the Men group – 22.91%; irrespectively of the total number of participants (see Table 6-25). This first result confronted some literature generalizations that mentioned men more interested in the use of technology for learning; but somehow corroborated debates that discuss how long concepts on mobile learning theories can last.

Although minimal, that unexpected result in gender difference almost inexistent helps to alter the panorama of a “dominant gender” when the question is technology. As previously mentioned, there was a tendency to see, especially in Western societies, men

being more inclined towards pursuing a career in hardware development or software design but the expression “dominant force” does not fit into the technology acceptance debate any longer, in special the mobile use debate. A ‘slight advantage’ favoring one side over another must be a more adequate term to explain the current situation. As a matter of fact, when we verified the rate of the Potential Re-Adopter category separately, patterns changed again and men statistics were greater than women, with 54.19 % of men declaring to retake the use of the apps soon while women corresponded to 46.15%. Higher percentages among men, moves the scale back to the other side. If we had more ‘adopters’ among women; now we observed more ‘potential re-adopters’ among men as seen in Table 6-25.

One possible interpretation on reading these percentages is that once women decreased their use of the app it was easier for them to abandon for good the mobile application and information available in literature corroborates that fact. To the men, abandoning the apps was harder. When tallying both categories (adopters and potential re-adopters) to discover the acceptance rate respecting gender, it revealed an 8% difference leaning towards men. 77.1% of the males fit into this group while 69.1% of females belong to it.

It is not possible to have a conclusive perception of acceptance in relation to gender if we do not take into consideration the rates of rejection expressed by men and women in the study. Women were 23.05% of the Quitters (participants who used the apps then abandoned them or just downloaded but never tried) whereas men corresponded to only 14.58% of this group. Probably we can have two possible explanations here. Perhaps women were less patient towards complex procedures, HCI, functions and elements that compose mobile applications and the way they work and consequently, abandoned them or they just did not see their linguistic needs contemplated and put the applications down. Future studies could investigate why these differences happened among results. To conclude the rejection verification, prevalence changes side again and it was accounted more men in the Non-Installer group – 8.32% than women with 7.75%. Reckoning rejection totals we ended with 30.8% of women and 22.9% of men.

Analyzing research question #1 in relation to the universities involved and their rates, the acceptance and adoption of the apps had an overwhelming difference

between UNIT/Brazil and UNL/Portugal. At the Portuguese university, only 29.4% of the participants decided to accept the mobile applications and 70.6% rejected this m-Learning experience, whereas at the Brazilian institution encompassing graduates from 3 different courses numbers were quite the opposite. From Biomedicine we had an acceptance rate of 93.7%, to the Petroleum Engineering graduates acceptance reached 70 % and to the English Language department, 76.4% of future EFL teachers decided to accept and use the apps. The average of acceptance at the Brazilian institution was 80.03% as available in Table 6-26. Taking for granted that presentations and procedures were the same in both institutions, these findings led researchers to two possible explanations on relevant UNL rejection rates that could be further investigated.

The first is the level of English proficiency among the population in Portugal. As mentioned previously, according to Education First English Proficiency Index, Portugal stands at the 13th position worldwide and it is considered of High Proficiency. On account of UNL participants being natives, this may be one of the reasons why there was not so much interest in the applications – participants already have high proficiency in English and did not find a lot of advanced level (C1, C2) activities on the apps. The second factor may relate to the time available. Some UNL participants were post graduates attending Master and Doctorate programs who, aside from having domain in the English language to attend those programs, generally are short on free time to embrace extra activities such as adopting these mobile apps.

On the other hand, Brazil stands at the 41st position in the ranking of EF English Proficiency Index (Low Proficiency) and participants may have seen an interesting and practical form of acquiring some language proficiency via the apps as private English courses in Brazil are expensive and regular school classes barely cover some basic grammar fundamentals. Among UNIT graduates, Biomedicine had the lowest average score at the proficiency test – 4.3 (Table 6-5) and were the ones who presented the highest rates of acceptance – 93.7%. The reasons for adoption by this group may vary as individuals have diverse interests but this correlation makes sense in pedagogical terms because it is possible that their low grades on the proficiency test made them adopt more than the other groups.

The English Language group at UNIT justified its interest considering that apps may be around their future careers and their students will make use of some,

demonstrating a relevant 76.4% of acceptance. Nonetheless, we are aware of the shortcomings Brazilian education has to overcome first before worrying about mobile learning opportunities to teach and learn English. Petroleum Engineering represented the lowest rate of acceptance at UNIT – 70% and the reasons are not clear to the researchers. We are under the impression that hindering conditions (screen size and Internet connection) may have played a major role to this as numbers as Table 6-12 can confirm.

To conclude the initial answers to our objectives and to Research Question #1, variables and determinants from our nomological network of determinants entitled UTAUT+M are evaluated to a final understanding of the attributes that helped to achieve these rates mentioned above and as seen in Table 6-27. Determinant 1 dealt with Performance Expectancy and its variable of Advantage to learn had 47.5% of adopters and potential re-adopters combined assuming that controlling your Own Rhythm of studies is a relevant attribute to adopt mobile learning. This independence is confirmed by the literature and is very much yearned for the app generation which has independence and autonomy as high values. D1 also questioned about the productivity ICT implements in learning and a 62.2% of 'agree' as an answer is sufficient to understand participants are fond to the idea. These two attributes of D1 combined may have enforced adoption and re-adoption perspectives and fit to the individual values of post-modern times.

Linguistic Relevance was determinant 2 and composed by the variables: reason to study English, difficulties with the idiom and the proficiency test which was used as a motivator to participants and as a reference to researchers. This combination of factors may lead someone to try and use a mobile application and satisfies his/her language needs. The professional career was indicated by 63.4% of users (Table 6-9), which demonstrates concordance to the high number of units and lessons on the applications geared towards to professional vocabulary and working situations using the language. The professional use of the idiom in careers follows the logic of Oral Skills being the difficulty with the language participants want to overcome. For 48.7% of adopters and potential ones, to develop communicative skills and conversational aspects is the most important in English, especially under the linguistic competence in a Chomskyan view; and the apps present more Oral skills than other activities on their units.

The next determinant was the one outlining the original contribute to this PhD study and it is based on the analysis and conclusions about the Hindering Conditions (Determinant 3) and their variables that affected acceptance, adoption and rejection of the mobile applications. At odds with the literature which mostly focus on 'facilitating conditions', we inverted the semantical aspect and aimed at discovering which attributes may justify for the negative side of using smartphones in m-Learning experiments, and consequently increase rejection and here, the device usability and specifications for mobile learning played a major role.

The few studies that performed an analogous work were used as reference to choose attributes to the questionnaire. 67.5% of partakers in our study considered small screens as the main negative aspect when studying with smartphones and, on this specific item, the opinion of the participants who abandon the app was more relevant than of adopters and potential re-adopters. To Quitters, 27.3% of the abandonment of the apps was due to reduced size of screens; add to this figure the 40.2% of adopters and potential ones who also appointed that factor, although they kept using the apps and the total 67.5% is set, a fundamental element to D3 as seen in Table 6-12.

The second hindering aspect concerning the applications was the methodological approach of the lessons available on the apps which was a pertinent influence on the rate of rejection. Logically, this specific issue was responsible for quitting rather than adopting. Quitters were 31.8% of the participants who did not fit into the methods presented by the virtual learning environments and when we added the 18.3% of adopters and potential ones that also clicked on that answer, although using the apps, this attribute reckoned to 50.1% of all participants (Table 6-12). Thus, content and methodology designers working with MALL applications have lots of work ahead.

The next element under discussion to this conclusive part of hindering factors that influenced or not acceptance is related to subjective norm in correlation to rates and results. As previously explained, subjective norms correspond to social influences people are submitted to adopt or not determined technology. Many times, according to mobile learning and innovation literature, this has been the decisive factor for the very adoption. Co-workers have more influence on adoption of some new technology than demands from bosses in the corporate world. That said, we analyzed how partakers would feel when they demonstrate some lack of knowledge with smartphones with

friends. We were looking for restraining behaviors to smartphone use as it was mentioned in the literature. The percentage of adopters and potential re-adopters that answered 'Disagree" to this assumption was 33.0% (Table 6-13) demonstrating they do not feel discomfort at showing that. Yet among adopters and potential ones who answered 'totally disagree' were 13.4% of the sample. This 46.4% show that this is not an issue on determinant 3 to hinder or hamper m-Learning, what puts even more emphasis on the size of the screen and methodologies to the rejection factor. With these first three determinants we were comprehending elements that worked over concepts and principles of Technology Acceptance Model (TAM).

Determinant 4 – Technology Readiness for m-Learning – was established with variables and attributes related to theories in Technology Readiness, that mingled with TAM composes an important part of the fabric of our UTAUT+M. We assessed partakers in two issues: how comfortable they felt in using their smartphone as learning tools, making it clear that it was not about daily use but how they understood smartphones as an educational instrument. Again based on state-of-the-art literature, attributes pointed to the direction that graduates felt Comfortable (65.9%) and Interested (26.8%) and these percentages are close in values to the acceptance rates in final adopters and potential ones as seen in Table 6-14.

Perhaps reality nowadays is more and more adequately explained by Connectivism and authors dealing with mobile learning have pragmatic grounds for further research, as participants responding to phone use as a Challenge were a minimal 2.4% of the sample. To reinforce this parameter, we submitted learners to an agreement/disagreement assumption about learning content in educational institutions to be delivered only via multimedia format enforcing a redefinition of the teachers' role. Responses as 'agree' accounted for 45.1% and 'totally agree' to 13.4% (Table 6-15). Nevertheless, we cannot take this as a total acceptance to drastic transformations in educational procedures as "halo effect" has reported in literature. Consequently, we may say that among Determinant 4 and its readiness' attributes there are strong arguments to answer research question #1 and towards the success of MALL but future study is still requested.

Volitional control or Voluntariness of Use was the determinant selected for D5, and we focused its analysis on participants' availability of time to use the mobile apps.

Literature establishes some other concepts to voluntariness formulating differences between compulsory and autonomous adoption, as well as working or entertainment situations; voluntariness based on previous experience versus no-experience. Our intention was a different one, since our sample was composed by graduates who have hectic schedules; we intended to verify how these mobile applications would fit into that agenda. As displayed in Table 6-16, 39.0% among adopters and potential re-adopters asserted having two hours a week for the SLA apps and 31.7% responded having 4h in the same group. These rates refer to after the 60-90 trial period and it goes along with literature asserting time limitation as a decisive element to mobile learning attitudes. Graduates want small bits of learning and our selected apps provided exactly that. Once again, we might take into account particularities of time in this sample and other populations.

The second variable on D5 was linked to time as well but in an individualized prerogative of how participants feel about not having a regular schedule to learn the language, one of the fundamental aspects about mobile learning in many works through literature and possibly a convenient feature for its 24/7/365 availability. Through a Likert-scale, 30.4% agreed to the fact they could use it anytime and 19.5% totally agreed with that. These adopters and potential ones accounted for half (49.9%) of the category as displayed in Table 6-17. We may say that these two time-related attributes of D5 have influence on adoption and helped to answer research question #1.

The third theory composing our UTAUT+M comes from Diffusion of Innovations, in the steps of the process entitled Knowledge and Persuasion, when an innovation is introduced to future potential users, many times under an explanation route; and considered by many authors in the field an elemental phase into adoption. According to literature, these two initial procedures can dictate what happens next: adoption or rejection. In Table 6-18, Adopters and Potential Re-Adopters compose 58.6% of the sample who considered presentations Stimulating meanwhile 31.7% saw them as Adequate. Thus, the researchers' task of diffusing the innovation was considered a positive influence by a 90.3% of the ones accepting the experience.

Certainly, these six determinants previously discussed display what happened to the adoption process here and are connected in a symbiotic way to Connectivism (non-human appliances as learning source; participants being in contact with other students

via Busuu), rationality (judgment of value and control of use), knowledge society, portability and ubiquity (new cornerstones for education) and we come back to these aspects on the next subchapter.

As to **Research Question #2**, we now enter into the discussion of how rates of acceptance expressed by the adopters and potential ones responded the question of which is the most adequate application to be recommended to graduates as curriculum development inside higher education institutions.

Bearing in mind we gathered our data and perceptions from only two universities with opposing results; prudence recommends attention to generalizations about these outcomes. However, as the most downloaded, adopted and used application in the study, rates of Duolingo may have to be understood as a "country mile" advantage over the other applications aside from Babbel, rated as #2 most accepted app in the study (Table 6-24). In relation to the other selected app, Acceptance of Duolingo (39.7%) surpassed the rates of Busuu (12.3%), British Council (9.6%) and Speak English (2.5%) combined.

Rejection rate from Duolingo was also the lowest one (16.6%) and this may help to explain why this application has 90 million downloads worldwide and it is considered the one of the most successful cases in MALL. As in our study participants could install more than one app on their smartphones, Duolingo was downloaded by 43.2% of the sample and Babbel (#2) was installed by 25.0% of partakers (Table 6-24). We amplified the original project idea submitted to FCT in using the "winner app" at our C1, C2, English and American Literature classes at Universidade Tiradentes and extended the horizon outlining an analysis to encompassing qualities that can be incorporated at any university course; a broader perspective, if we may. Through the comparative analysis executed at subchapter 4.5, we selected elements that illustrate the qualities of applications and we discussed them as follows.

Duolingo presented a diversified offer of activities covering Listening, Speaking, Reading and Writing – having all 4 skills contemplated which is a major necessity in language studies. Its communicative competence is focused on Linguistics with emphasis on vocabulary acquisition, grammar aspects and short expressions of communicative approach. It has a randomized acquisition of words concentrated either on socio-linguistic competences such as "greetings", "saying goodbye", "at the

restaurant" or grammatical elements as "articles" or "basic verbs". This feature directly attended claims of Oral Skills practices from participants as seen in Table 6-9. On listening practices, the slow audio option (only app among the selected five to have this feature) enhances practice and helps the automatic speech recognition of speaking activities as well.

The application also provides the chance of listening to sentences and small dialogues read by natives with scripts and automatic translation to Portuguese. Quality of feedback is immediate, supported on the right or wrong dichotomy, meaningful and game-based with Lingots, a measurement unit the application developed to account for progress in learners and provoke motivation. New episodes can be delivered via email and users also receive email alerts to units and exercises left unfinished. At last, Duolingo mobile application can be used offline if lessons are downloaded in advance and it is completely free of charge as detailed in Table 4-1.

These characteristics contemplate most of what a learner searches in Second Language learning although personal necessities with the idiom may not find resonance in all situations displayed on the app. University graduates, especially beginners in the language, can use Duolingo to improve their English knowledge irrespectively of their areas and this mobile app can be a reliable extra-class enhancement for free. Limitations to the app come to the fact that C1 and C2 levels are contemplated but in a minimal standard. The bulk of Duolingo activities are pointed to A1, A2 and B1 levels (56.8% of our sample) as seen in Table 6-11. Universities who adopt the app can improve graduates' soft skills of communication and incorporate the importance given to English using as a reference responses from participants in this study. As research question #2 inquired which application is recommended for curriculum development in Higher Education Institutions, the answer from this investigation is Duolingo.

7.2 Outcomes of the Investigation

After research questions were addressed and answered reaching our objectives of verifying readiness and acceptance to SLA apps from participants, promoting a contribution to the development of alternative methodologies to learn English; we

developed a holistic perspective on the outcomes of the study, in special for what results could translate when intertwined with the literature. Connectivism comes as a first due to the nature of the experience developed here and to the breaking of paradigms it imposed on most of our participants. Defined as a theory where relations with computers are at the core of it, this theoretical comprehension of reality in education was perceived throughout this work. In fact, our connectivist practice promoted with smartphones and second language learning applications had characteristics of the theory implied. For instance, English learning on the apps connected specialized nodes and information sources of the language residing in machines to participants who acted critically and developed linguistic acquisition. For Connectivism, decision-making is in itself a learning process and that is exactly what happened to our participants.

Since day one after presentations, partakers had to decide which app they would use based on the information they received and verified; they downloaded and tried applications, evaluated the features and linguistic skills available and used them. If the application fulfilled expectations, continuous use happened; if not, a new app was tried. For connectivists, this shifting of actions and connections between important and unimportant information related to knowledge one wants to acquire has to be defined as learning. Having to interact with "non-human appliances" and learn from them, deeply relates to the ideas of authors involved with the theory. On this Heutagogy, learners voluntarily interact with knowledge and there is great focus on 'the individual' as it is delineated. This connection to the database and to the right people, as some apps offer this possibility of interacting with other language learners, definitively has to be classified as a learning experience in connectivist terms.

New forms of linguistic knowledge were defined from this experience, acquisition happened in a density that attended to the participants' needs and it respected their time constraints with bite-sized lessons. As learner-centered and individualized, Connectivism totally encompasses what occurred on the mobile assisted language learning promoted in this study, including its home-style approach and the dialectics of current living. Literature raises the question that computers and smartphones in education have to overcome the 'another mere vehicle' argument and become elements of redesigning of what knowledge gathering really means. On this redesigning, we have

to move from users being comfortable with smartphones for daily communication and to mastering the plethora of opportunities these gadgets can bring into learning, in special to foreign language learning. Our results in acceptance showed that mobile learning and Connectivism was possible as adopters and users of our selected SLA apps demonstrated but it is a long journey ahead before mainstream overall acceptance is seen.

Connectivism comes from adopting attitudes towards e-Learning or m-Learning and, in many ways, it imposes the diffusion of an innovation to users, be it through a new device or of a software or app updated version. The Diffusion of Innovation implied on this PhD study brought to 113 participants the opportunity of getting familiar to new forms of learning English and from the rates of Adopters and Potential Re-Adopters seen in Table 6-25, we may state that diffusion was successful. From an audience where only a handful of students knew about the SLA apps before presentations to having 26 adopters and 56 potential ones which corresponded to 72.5% of all people involved accepting this form of learning, it suffices to say diffusion was successful. However, it is also prudent to mention that due to the level of voluntariness necessary to install the apps and use them as part of a research, we had a reduced sample from 173 to 113 graduates and they have similar social conditions and approximated levels of technology readiness what may have helped results to achieve these satisfactory rates.

Diffusion of an m-Learning innovation is not an easy task in a world of terabytes of information available at one click and where distractions and entertainment online abound. And for educational practices, changes generally happen in a slower pace than other sectors of society; thus diffusing new practice paradigms to the proportion mobile learning encompasses is a gargantuan task. Higher education institutions have a challenge in front of them, and it must be addressed as soon as possible since improvements of mobile industry overwhelmingly dictates trends in the sector, and will impose to curricular procedures constant updating.

This innovative and connected form of learning available in our smartphones will definitively transform teaching, learning and the acquisition of knowledge. Just watch a 6-year old interact with a cell phone and one becomes appalled to how 'natural' it seems to them. Digital natives, digital immigrants, and today we are all associated with a 'digital' badge on the discussions of education and mobiles getting merged. In our study,

100% of students had smartphones, from updated versions of iPhones and Samsungs to some simpler models but all were equipped with touch screens.

BYOD (Bring Your Own Device) was a fundamental element to the fulfillment of tasks at this experience. Mobile learning or m-Learning theorists rush to emphasize that definitions of the term are porous, wide and contemplate experiences of smartphone use either in formal settings inside university classrooms to learning with peers on completely informal scenarios. The discussion is beyond the mobility and portability issue already; experts now try to implement forms of knowledge that incorporate smartphones to the solutions of problems in academic routine.

Unfortunately, many e-Learning concepts are still transported to the analysis of mobile learning experiences but the sheer difference in nature to both formats require a specific and coherent assessment for mobiles in education. Progress has been made with conferences and publications devoted only to mobile but, especially in Brazil, a lot of ground has to be covered before these discussions reach the top of the list of priorities. That fact aside, the mobile learning experienced brought to participants of the study was meaningful and it was translated by the achieved results. To the acceptance and adoption we testified in the work, hindering conditions still represent a significant barrier to m-Learning becoming conventional. As observed by partakers, screen size, poor internet connection and inadequate methodologies can hamper the use and lead to the “disenchantment discontinuance”.

Another original and significant contribute of the work is the formulation of our UTAUT+M, adapting elements of Technology Acceptance Model, Diffusion of Innovations and Technology Readiness, three theoretical constructs that may work in favor of technology acceptance and that we decided to merge choosing appropriate determinants from each one. Performance Expectancy (TAM), Linguistic Relevance (TAM), Hindering Conditions (TAM), Technology Readiness for m-Learning (TRI) and Voluntariness of Use (TAM) allied with Knowledge & Persuasion (IDT) forged the variables that permitted to the authors evaluate how participants negotiated their adoption of the apps. Rejection was also measured through the absence of these features. On this quest for readiness and acceptance in a unified theory we had extreme care not to repeat what is already done and available in literature and therefore, we

researched about Hindering conditions, not favoring ones and about Rejection included, not only Adoption.

After results were tallied, participants were separated according to their answers and placed into four categories: Adopters, Potential Re-Adopters, Quitters and Non-Installers; descriptions of each made on the previous Chapters. As a research involving mobile assisted language learning for second language acquisition, an investigation on what led people to undertake new frontiers of L2 learning not only presents itself as relevant but elementary to comprehend language acquisition in modern days, or post-modern if you will. MALL can be a new 'vehicle' or just a fad, but the sheer number of downloads displayed just by the 5 apps selected for this study, more than 200 million worldwide, reveal MALL applications are not something to be underestimated.

Mobile Assisted Language Learning certainly enforces an adjustment to the role of teachers, gradually seen as a coach, mediator or mentor but much more to the role of the learner, now maximized with total responsibility for success as a student-oriented approach is what intrinsically defines MALL. Advantages appointed in Table 6-7 such as Own Rhythm of studies and be outside formal learning settings reinforce this learner-centeredness perspective and it is where knowledge is built upon through individual cognitive abilities developed over prior knowledge.

Inevitably, as open coursewares and online universities exemplify, educational institutions will survive to the establishment of mobile learning as they have survived transformations brought by the printed press, radio, cinema, television, desktop computers, notebooks and the Internet. M-Learning is literally inserting the university on everyone's pocket and what institutions have to invest is on developing an application that becomes relevant to graduates and their mobile using. Although with interesting websites for e-Learning initiatives, the two institutions involved in this PhD work still do not have a mobile application developed for their students on these bases.

Most of the graduates involved declared having the need to learn English as it was demonstrated on our results and many Brazilians (UNIT) as well as some Portuguese students (UNL) would certainly improve their overall knowledge learning a lingua franca through an application developed for their curriculum and courses, providing them real language learning possibilities in their specific area of graduation.

7.3 Constraints to the research

We cannot conclude this work without specifying some of the limitations to the research. They may have affected the results provided by participants although we have not questioned them about the issue; these are logical assumptions based on evidences. The first issue is related to the total number of participants – the sample. The inevitable reduction from 188 people to 173 and then to 113 may have affected a better perception of the determinants and variables that influence acceptance and adoption.

This reduction was determined by the level of voluntariness involved in the study. Aside from being a volunteer in a social research, participants were invited to adopt mobile applications and alter their digital practices incorporating the use of apps to learn English to their 'digital' routines. 60 individuals did not see any advantage on that and abandoned the study. The authors insisted on them with emails and whatsapp messages (3x) reminding them of the benefits presented on the apps and the possibilities of controlling your own learning. The absence of their answer on Google forms had to be considered as drop-outs.

The second issue that may have affected our results was the granting permission of Plataforma Brasil which hampered progress of the research to be performed inside UNIT installations for 120 days delaying the collection of data.

The third constraint was the impossibility of revisiting UNIT participants in Brazil for semi-structured interviews after they delivered responses on Questionnaire 4. Financial restrictions and logistics limitation and deadlines imposed by Erasmus allied to UNIT and UNL opposing calendars did not permit gathering more information on participants and their adoption impressions. Fortunately, the obtained data from Q1, Q2, Q3 and Q4 provided adequate responses to the research questions.

As already noted, we could not fully profit from the initial D-bR approach due to the lack of time to manage the optimization cycle of the process of mobilizing more users to the study thus achieving an even better result.

7.4 Further Research

Most of social researches never end on obtained results. Diverse consequences and questions that remained unanswered permeate the conclusions and sometimes create an agenda to the authors and their future study. In this one, we have unanswered issues concerning the rates of Rejection and why they happened to that figure. What led participants to abandon the experiment beyond the hindering conditions? What made them discontinue the use of the apps or why some individuals did not install any of the apps? These are inquiries for a next opportunity.

The second area that called our attention to further research is to develop solutions to overcome the hindering conditions we detected. Small screens on smartphones are a commodity in modern life; the controversy here is what human-computer interfaces of mobile applications can do the decrease this effect working in association to content developers to second language acquisition practices.

The third element for our future study is how mobile assisted language learning can help Brazil to overcome its linguistic deficit concerning English proficiency and provide better working opportunities to a population that still yearns for life advancements already established in other parts of the world such as Portugal.

REFERENCES

Abrantes, S. (2011). *O m-Learning no contexto do ensino superior: uma proposta para a sua avaliação em ambientes colaborativos*. Tese de Doutoramento. Universidade Fernando Pessoa. Retrieved from: bdigital.ufp.pt/bitstream/10284/2242/1/TD.pdf

Abu-Al-Aish, A., & Love, S. (2013). Factors influencing students' acceptance of m-learning: an investigation in higher education. *The International Review of Research in Open and Distance Learning*, *14*(5). 83–108. Retrieved from: http://www.irrodl.org/index.php/irrodl/article/view/1631

Agarwal, R., & Prasad, J. (1999). Are individual differences germane to the acceptance of new information technologies? *Decision sciences*, *30*(2), 361-391. Retrieved from: http://www-o.ntust.edu.tw/~lib/pdf/Doctor/91/d911204e.pdf

Agulló, G. L., & Vallejo, N. M. (2015). *Mobile learning in the Foreign Language Classroom.* Huarte de San Juan. Filología y Didáctica de la Lengua, (15), 79-103. Retrieved from: https://dialnet.unirioja.es/servlet/articulo?codigo=5414584

Ahmad, M. I. (2014). Unified Theory of Acceptance and Use of Technology (UTAUT): a decade of validation and development. *In Forthcoming, accepted for presentation in The Fourth International Conference on ICT in Our lives*. 20-22. Retrieved from: https://www.academia.edu/9973205/Unified_Theory_of_Acceptance_and_Use_of_Technology_UTAUT_A_Decade_of_Validation_and_Development

Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes, 50*(2), 179-211. Retrieved from: http://www.dphu.org/uploads/attachements/books/books_4931_0.pdf

Ajzen, I. (2002). Perceived behavioral control, Self-Efficacy, locus of control, and the theory of planned Behavior1. *Journal of applied social psychology, 32*(4), 665-683. Retrieved from: http://server2.docfoc.com/uploads/Z2015/12/26/e7221cvpXc/ed1cbb4e047109f8f53e9202bb6d7818.pdf

Akbar, F. (2013). *What affects students' acceptance and use of technology*? Dietrich College Honors Theses. Carnegie Mellon University. Retrieved from: http://repository.cmu.edu/cgi/viewcontent.cgi?article=1168&context=hsshonors

Alda, L. S., & Leffa, V. J. (2014). Entre a carência e a profusão: aprendizagem de línguas mediada por telefone celular. *Conexão-Comunicação e Cultura, 13*(26). Retrieved from: http://www.ucs.br/etc/revistas/index.php/conexao/article/viewFile/2556/1756

Al-Fahad, F. N. (2009). Students' attitudes and perceptions towards the effectiveness of mobile learning in King Saud University, Saudi Arabia. *TOJET: The Turkish Online Journal of Educational Technology*, *8*(2). Retrieved from: http://files.eric.ed.gov/fulltext/ED505940.pdf

Alonso, K. M. (1996). Educação a distância no Brasil: a busca de identidade. *Educação a distância: Inícios e indícios de um percurso*. Nead/IE–UFMT. Cuiabá: UFMT, 57-74. Brasil: Editora UFMT.

Alsup, J. (2006). *Teacher identity discourses: Negotiating personal and professional spaces*. UK: Routledge.

Anderson, T. & Kanuka, H. (2003) *e-Research: methods, strategies and issues*. Boston: Pearson Education.

Anderson, T. (2008). *The theory and practice of online learning*. Athabasca University Press. Edmonton: AUpress. Retrieved from: http://cde.athabascau.ca/online_book/pdf/TPOL_book.pdf

Anderson, T., & Shattuck, J. (2012). Design-Based Research: A Decade of Progress in Education Research? *Educational Researcher, 4*, 16-25. Retrieved from: http://edr.sagepub.com/content/41/1/7.full.pdf+html

Assila, A., Oliveira, K. & Ezzedine, H. (2014). Towards qualitative and quantitative data integration approach for enhancing HCI quality evaluation. *Human-Computer Interaction. Part I. HCII 2014*, 469–480.

Ausubel, D. P. (1963). *The psychology of meaningful verbal learning*. Retrieved from: http://psycnet.apa.org/psycinfo/1964-10399-000

b96e36a2a92d14b754e5c5c4a1.pdf

Bachman, L. F. (1991). What does language testing have to offer? *Tesol Quarterly, 25*(4), 671-704. Retrieved from: https://www.researchgate.net/profile/Lyle_Bachman/publication/260304333_What_Does_Language_Testing_Have_to_Offer/links/54bffb890cf28eae4a666ae6.pdf

Ballard, B. (2007). *Designing the mobile user experience*. USA: John Wiley & Sons.

Bandura, A. (1995). *Self-efficacy in changing societies*. Cambridge University Press.

Banga, C. & Weinhold, J. (2014). *Essential mobile interaction design*. Canada: Adisson-Wesley. 104-105.

Barab, S., & Squire, K. (2004). Design-based research: Putting a stake in the ground. *The Journal of the Learning Sciences, 13*(1), 1-14. Retrieved from: http://ro.ecu.edu.au/cgi/viewcontent.cgi?article=2611&context=ecuworks

Barabási, A. L. (2002). *Linked: How everything is connected to everything else and what it means*. USA: Plume Editors.

Bartholo, V. F., Amaral, M. A., & Cagnin, M. I. (2009). Uma contribuição para a adaptabilidade de Ambientes Virtuais de Aprendizagem para Dispositivos Móveis. *Revista Brasileira de Informática na Educação, 17*(02), 36-47. Retrieved from: http://br-ie.org/pub/index.php/rbie/article/viewFile/97/84

Bastien, C. & Scapin, D. (2003). Ergonomic criteria for the evaluation on human-computer interfaces. *Programe 3 – Artificial intelligence, cognitive systems and man-machine interaction*. Retrieved from: http://www.irit.fr/~Mathieu.Raynal/docs/Ergonomic_Criteria.pdf

Bastos, M. & Ramos, M. (2015). Tecnologias e competências de pensamento na aprendizagem da língua estrangeira-inglês. *Revista Científica e-Curriculum, 13*(3), 589-609. Retrieved from: http://revistas.pucsp.br/index.php/curriculum/article/download/24732/17668

Bauerlein, M. (2011). *The Digital Divide: Arguments for and Against Facebook, Google, Texting, and the Age of Social Networking*. Penguin. Retrieved from: http://www.academia.edu/download/43830945/_Mark_Bauerlein__The_Digital_Divide_Writings_for_Bookos.org.pdf

Bauman, Z. (2001). *Liquid Modernity*. *Contemporary Sociology (30).* Retrieved from: http://doi.org/10.2307/3089803

Bax, S. (2003). Normalization revisited: the effective use of technology in language education. *International Journal of Computer-Assisted Language Learning and Teaching. 1*(2), 1-15. Retrieved from: https://www.academia.edu/3754724/Normalization_Revisited_The_Effective_Use_of_Technology_in_Language_Education

Beatty, K. (2010). *Teaching and researching computer-assisted language learning*. Pearson Education. UK.

Beishuizen, J. & Stefens, K. (2011). Self-regulated learning in technology enhanced learning environments: a European perspective. *Technology Enhanced Learning, 5*, Sense Publishers.

Bernardo, H. D. M., & Bielawsky, L. (2003). O Futuro do e-Learning. *SPI - Sociedade Portuguesa de Inovação, ISBN*, 972-8589. Retrieved from: http://web.spi.pt/madilearning/manual6/OFuturodoeLearning-formando.pdf

Benson, P. (2007). Autonomy in language teaching and learning. *Language teaching, 40*(01), 21-40. Retrieved from: http://www.academia.edu/download/30300888/benson_artigo.pdf

Birdsall, W. F. (1996). The Internet and the ideology of information technology. In *INET96 Proceedings, 96*. Retrieved from: https://www.isoc.org/inet96/proceedings/e3/e3_2.htm

Blake, R. J. (2008). *Brave new digital classroom: Technology and foreign language learning.* Georgetown University Press.

Blyth, C. (2009). From textbook to online materials: the changing ecology of foreign language publishing in the era of ICT. Foreign language learning with digital technology, 174-202.

Bobsin, D., Visentini, M. S., & Rech, I. (2009). Em busca do estado da arte do UTAUT: ampliando as considerações sobre o uso da tecnologia. *RAI: revista de administração e inovação, 6*(2), 99-118. Retrieved from: http://www.revistas.usp.br/rai/article/viewFile/79142/83214

Bodnar, S., Cucchiarini, C., Strik, H., & van Hout, R. (2014). Evaluating the motivational impact of CALL systems: current practices and future directions. *Computer Assisted Language Learning*, *8221*(July 2014), 1–27. Retrieved from: http://doi.org/10.1080/09588221.2014.927365

Bo-Kristensen, M., Ankerstjerne, N., Neutzsky-Wulff, C., & Schelde, H. (2009).Mobile city and language guides—New links between formal and informal learning environments. *Electronic Journal of e-Learning, 7*(2), 85–92. Retrieved from: http://eric.ed.gov/?id=EJ867105

Bottentuit Junior, J. B. (2012). Do Computador ao Tablet: Vantagens Pedagógicas na Utilização de Dispositivos Móveis na Educação/From Computer to Tablet: Advantages in the Pedagogical Use of Mobile Devices in Education. *Revista educação online, 6*(1), 125-149. Retrieved from: http://www.latec.ufrj.br/revistas/index.php?journal=educaonline&page=article&op=download&path%5B%5D=291&path%5B%5D=416

Brooks, J. & Brooks, M. (1999). *In search of understanding: the case for constructivist classrooms*, 101-118. ACSD.

Brown, E. (Ed.) (2001). Mobile learning explorations at the Stanford Learning Lab. *Speaking of Computers, 55*. Stanford, CA: Board of Trustees of the Leland Stanford Junior University. Retrieved from: http://sll.stanford.edu/projects/tomprof/newtomprof/postings/289.html

Brown, H. D (2000). *Principles of language learning and teaching*. Cambridge University Press. Retrieved from: http://www.academia.edu/download/40433526/_H._Douglas_Brown_Principles_of_language_learningBookZZ.org.pdf

Brown, T, & Mbati, L. (2015). *Mobile Learning: Moving Past the Myths and Embracing the Opportunities*. Retrieved from: http://www.irrodl.org/index.php/irrodl/article/view/2071

Bruner, J. S. (1996*). The culture of education*. Harvard University Press. Retrieved from: https://www.cs.kent.ac.uk/people/staff/saf/share/great-missenden/reference-papers/brunerFolkPedagogy.pdf

Buckingham, D. (2008). *Youth, identity, and digital media*. 119-142. Cambridge, MA: MIT Press.

Burston, J. (2015). Twenty years of MALL project implementation: A meta-analysis of learning outcomes. *ReCALL, 27*, 4-20 doi:10.1017/S0958344014000159

Caldas, O., Costa, C. & Pagliarussi, M. (2016). Corrupção e composição dos gastos governamentais: evidências a partir do programa de fiscalização por sorteios públicos da Controladoria-Geral da União. *Rev. Adm. Pública: Rio de Janeiro.50* (2), 237-264. Retrieved from: http://www.scielo.br/pdf/rap/v50n2/0034-7612-rap-50-02-0037.pdf

Campos, A. A. & Freitas, J. C. de (2015). Assessing and implementing English learning mobile applications in a university graduation program: SLA 2.0. In *Proceedings of the Computer Supported Education 2015*, Lisbon, 23 – 25 May 2015. Portugal: INSTICC

Campos, A. A. & Freitas, J. C. de (2016). Interface Humano-Computador em aplicativos móveis para aprendizagem de inglês: o feedback imediato como critério para implementação curricular. In *Proceedings of the 1ª Conferência da Sociedade Portuguesa de Ciências da Educação* – SEC, 25 – 27 January 2016. Portugal: Universidade Lusófona.

Campos, A. A. & Freitas, J. C. de (2016). Reconhecimento automático de fala (ASR) e aquisição de segunda língua: práticas de pronúncia do inglês no aplicativo Babbel. In *Proceedings of the 7º Simpósio Internacional de Educação e Comunicação*, 14 – 16 September 2016 (1-14). Brasil; Universidade Tiradentes.

Campos, A. A. (2008). A aquisição da língua inglesa usando as novas tecnologias da *informação e comunicação:a apropriação do conhecimento*. Dissertação de Mestrado. Universidade Federal de Sergipe, Brasil.

Campos, A. A. (2012). Videopodcasts in English language learning: a great tool or another gimmick? In *Proceedings of the ICT for Language Learning 5th Edition,*Florence, 15 – 16 November 2012 (353-357). Italia: Libreria Universitaria.

Campos, A. A. (2016). Linguistic meaning in self-regulated strategies: a doctoral research into mobile assisted language learning. In *Newton Fund Conference on the Philosophies of Mind, Language and Action*, 19 – 23 September 2016 (31-32). Brasil: Universidade de São Paulo.

Campos, A. A. (2016). Self-regulated strategies into mobile assisted language learning: a doctoral research including the apps Babbel and Speak English Daily. In *Proceedings of the 12th Teaching and Language Corpora Conference*, 20 – 23 July 2016. Germany: Justus Liebig Universität Giessen.

Candeias, A. (2009). *Educação, estado e mercado no século XX: Apontamentos sobre o caso português numa perspectiva comparada*. Lisboa: Edições Colibri.

Caplan, N. & Nelson, S. (1973). On being useful: the nature and consequences of psychological research on social problems. *American Psychologist*, *28*(3), 199.

Cardoso, S., Tavares, O., & Sin, C. (2015). The quality of teaching staff: higher education institutions' compliance with the European Standards and Guidelines for Quality Assurance—the case of Portugal. *Educational Assessment, Evaluation and Accountability*, *27*(3), 205–222. Retrieved from: http://doi.org/10.1007/s11092-015-9211-z

Carlão, A. (2009). *A integração de blogues e podcasts no ensino de inglês: impacte numa turma com percurso curricular alternativo. Um estudo de caso*. Dissertação de Mestrado. Retrieved from http://ria.ua.pt/handle/10773/1404

Carneiro, R., Lefrere, P., Steffens, K. & Underwood, J. (2011). Self-regulated learning in technology enhanced learning environments: a European perspective. *Technology Enhanced Learning, 5*. Springer Science & Business Media.

Carvalho, A. A. (2007). Rentabilizar a Internet no Ensino Básico e Secundário: dos e Ferramentas Online aos LMS. Sísifo. *Revista de Ciências da Educação, 03*, 25-40. Retrieved from: http://repositorium.sdum.uminho.pt/bitstream/1822/7142/1/sisifo03PT02.pdf

Carvalho, M., Guimarães, H., Freitas, A., Ferreira, J., & Giovannini, C. (2012). Intention to Use M-Learning in Higher Education Settings. *XXXVI Encontro Da ANPAD*, 1–16. Retrieved from: http://www.fumec.br/revistas/pretexto/article/download/1320/1453

Castells, M. (2005). *A Sociedade em Rede*. Majer. São Paulo: Editora Paz e Terra.

Castells, M., & Cardoso, G. (Eds.). (2006). The network society: From knowledge to policy. Washington, DC: Johns Hopkins Center for Transatlantic Relations. 3-23.

Castro, M. A. D. S. N. (2007). *Processos de auto-regulação da aprendizagem: impacto de variáveis académicas e sociais*. (Doctoral dissertation). Universidade do Minho. Retrieved from: https://repositorium.sdum.uminho.pt/bitstream/1822/7240/1/Tese%2520de%2520Marta%2520Castro.pdf

Cavalari, S. (2011). A autoavaliação da aprendizagem de inglês como língua estrangeira em um ambiente tandem a distância. *Revista Brasileira de Linguística Aplicada.11*(1), 247-270. Retrieved from: http://www.scielo.br/pdf/rbla/v11n1/v11n1a13.pdf

Ceia, C. (2003). New trends for language courses in a student-oriented curriculum: restructuring language undergraduate courses within the European Credit Transfer System (ECTS) and the principles of the Bologna Declaration. *Colóquio LINGUA (UE) Promouvoir l'apprentissage des langues vivantes de l'Europe: politiques et méthodologies*, 7-9 Abril de 2003, ENESAD – Tour Erasme – Campus Universitaire Montmuzard, Dijon, França.

Ceia, C. (2008). *O processo de Bolonha e as questões da empregabilidade e das saídas profissionais*. Retrieved from: http://www.fcsh.unl.pt/docentes/cceia/images/stories/PDF/educare/processo-bolonha-empregabilidade.pdf

Ceia, C. (2013). Advanced Research Projects in the Humanities: New Trends on Literature, Languages, and Linguistics Studies. *Sino-US English Teaching, 10*(12), 903-913. Retrieved from: http://www.davidpublishing.com/davidpublishing/Upfile/12/16/2013/2013121603375083.pdf

Chambers, A., & Bax, S. (2006). Making CALL work: Towards normalization. *System, 34*(4), 465-479. Retrieved from: http://fulltext.study/download/373835.pdf

Chapelle, C. & Douglas, D. (2005). *Assessing language through computer technology*. UK: Cambridge University Press.

Chen, C. M., & Chung, C. J. (2008). Personalized mobile English vocabulary learning system based on item response theory and learning memory cycle. *Computers & Education, 51*(2), 624-645. Retrieved from: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.473.3966&rep=rep1&type=pdf

Chen, C., & Hsu, S. (2008). Personalized Intelligent Mobile learning System for Supporting Effective English Learning. *Educational Technology & Society, 11* (3), 153-180.

Chen, X. (2013) Tablets for informal language learning: students use and attitudes. *Language learning and technology. 17*(1). Retrieved from: http://llt.msu.edu/issues/february2013/chenxb.pdf

Cheon, J., Crooks, S., Chen, X., & Song, J. (2011). An Investigation of Mobile learning Readiness and Design Considerations for Higher Education. *34th Annual,43*. Retrieved from: http://files.eric.ed.gov/fulltext/ED528860.pdf#page=54

Cheon, J., Lee, S., Crooks, S. M., & Song, J. (2012). An investigation of mobile learning readiness in higher education based on the theory of planned behavior. *Computers & Education, 59*(3), 1054-1064. Retrieved from: http://dl.acm.org/citation.cfm?id=2325086

Chinnery, G. M. (2006). Emerging technologies: going to the MALL (Mobile Assisted Language Learning). *Language learning & technology, 10*(1), 9-16. Retrieved from: http://llt.msu.edu/vol10num1/pdf/emerging.pdf

Chomsky, N. (1955). Logical syntax and semantics: Their linguistic relevance. *Language, 31*(1), 36-45. Retrieved from: https://chomsky.info/wp-content/uploads/195503-.pdf

Chomsky, N. (1967). *Recent contributions to the theory of innate ideas. In A Portrait of Twenty-five Years*. 31-40. Springer Netherlands. Retrieved from: http://isites.harvard.edu/fs/docs/icb.topic1327223.files/Recent%20Contributions.pdf

Cilliers, P. (2000). What can we learn from a theory of complexity? *Emergence, 2*(1), 23-33. Retrieved from: http://www.academia.edu/download/3239875/Moving_Beyond_Metaphor.pdf#page=24

Clarà, M., & Barberà, E. (2014). Three problems with the connectivist conception of learning. *Journal of Computer Assisted Learning, 30*(3), 197-206. Retrieved from: https://www.researchgate.net/profile/Marc_Clara/publication/259552573_Three_problems_with_the_connectivist_conception_of_learning

Cohen, L., Manion, L. & Morrison, K. (2007). *Research methods in education.* 6th edition. Routledge. Taylor & Francis: New York, USA.

Collins, A. & Halverson, R. (2009). *Rethinking education in the age of technology: the digital revolution and schooling in America*. USA: Columbia University Teachers College Press.

Collins, A., Brown, J.S. & Newman, S.E. (1989). Cognitive apprenticeship: Teaching the crafts of reading, writing, and mathematics, 453-494. In Resnick, L.B. (Ed.) *Knowing, learning, and instruction: Essays in Honour of Robert Glaser*. Hillsdale, N.J.: Lawrence Erlbaum.

Collins, A., Joseph, D., & Bielaczyc, K. (2004). Design research: Theoretical and methodological issues. *The Journal of the learning sciences, 13*(1), 15-42. Retrieved from: http://www.siumed.edu/academy/jc_articles/Shin_0217.pdf

Corder, S. P. (1973). *Introducing applied linguistics*. Penguin Books. USA.

Cortez, R. P., & Roy, D. (2012). Screen interface design for mobile-assisted language learning in EFL context: A case study in Japan. *Journal of Language Teaching and Research, 3*(3), 353-368. Retrieved from: http://doi.org/10.4304/jltr.3.3.353-368

Costa, G. (2013). *Mobile Learning: explorando potencialidades com o uso do celular no ensino - aprendizagem de língua inglesa como língua estrangeira com alunos da escola pública*. Tese de Doutorado. UFPE. Retrieved from: http://www.pgletras.com.br/2013/teses/TESE-Giselda-dos-Santos-Costa.PDF

Coutinho, C. P. (2015). *Metodologia de investigação em ciências sociais e humanas*. Portugal: Almedina.

Creswell, J. (2012). *Educational research: planning, conducting and evaluating Quantitative and qualitative research*. 4th Edition, Pearson Education: USA.

Cucchiarini, C., Bodnar, S. E., Penning de Vries, B. W. F., van Hout, R. W. N. M., & Strik, H. (2014). *ASR-based CALL systems and learner speech data: new resources and opportunities for research and development in second language learning*. Radboud University Press: The Netherlands. Retrieved from: http://repository.ubn.ru.nl/bitstream/handle/2066/133500/133500.pdf

da Moita Lopes, L. P. (2008). Inglês e globalização em uma epistemologia de fronteira: ideologia lingüística para tempos híbridos. *DELTA: Documentação e Estudos em Linguística Teórica e Aplicada, 24*(2). Retrieved from: http://revistas.pucsp.br/index.php/delta/article/viewFile/28316/19879

Dabbagh, N., & Kitsantas, A. (2012). Personal Learning Environments, social media, and self-regulated learning: A natural formula for connecting formal and informal learning. *The Internet and higher education*, *15*(1), 3-8. Retrieved from: doi:10.1016/j.iheduc.2011.06.002

Daeid, N. N. (2008). *Educating the next generation*. *Science and Justice* (Vol. 48). Retrieved from: http://doi.org/10.1016/j.scijus.2008.03.007

Dahlstrom, E., Brooks, C., & Bichsel, J. (2014). *The Current Ecosystem of Learning Management Systems in Higher Education: Student, Faculty, and IT Perspectives* (p.3). Research report. Louisville, CO: ECAR, September 2014. Retrieved from: http://www. educause. edu/ecar

Dahlstrom, E., Walker, J., & Dziuban, C. (2013). *ECAR study of undergraduate students and information technology*. Retrieved from: https://library.educause.edu/~/media/files/library/2014/10/ers1406.pdf

Davidson Wolf, J. L. (2011). Combining E-Learning and M-Learning: New Applications of Blended Educational Resources David Parsons, Ed. *American Journal of Distance Education*, *25*(4), 268–270. Retrieved from: http://doi.org/10.1080/08923647.2011.618291

Davies, A. (1999). *An introduction to applied linguistics: From practice to theory*. Edinburgh University Press. Retrieved from: http://kczx.gzhu.edu.cn/course_center/files_upload/20applied%20linguistics.pdf

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340. Retrieved from: http://www.academia.edu/download/32678146/Perceived_Usefulness.docx

de Almeida, M. E., & da Silva, M. D. (2011). Currículo, tecnologia e cultura digital: espaços e tempos de web currículo. *Revista e-curriculum, 7*(1). Retrieved from: http://revistas.pucsp.br/index.php/curriculum/article/viewFile/5676/4002/

de Figueiredo, A. D. (Ed.). (2005). Managing Learning in Virtual Settings: *The Role of Context*. IGI Global.

de Jesus Oliveira, K. E., de Jesus Lima, D., & de Magalhães Porto, C. (2015). Educação não escolar, aprendizagem ubíqua e novas formas de aprender. *Interfaces Científicas-Humanas e Sociais, 3*(3), 41-50. Retrieved from: https://periodicos.set.edu.br/index.php/humanas/article/viewFile/2162/1300

Demouy, V., & Kukulska-Hulme, A. (2010). On the spot: Using mobile devices for listening and speaking practice on a French language programme. *Open Learning, 25*(3), 217-232. Retrieved from: http://oro.open.ac.uk/24647/2/on_the_spot.pdf

Dias, G. A., da Silva, P. M., Delfino Jr, J. B., & de Almeida, J. R. (2011). Technology Acceptance Model (TAM): avaliando a aceitação tecnológica do Open Journal Systems (OJS). *Informação & Sociedade, 21*(2). Retrieved from: http://www.ies.ufpb.br/ojs/index.php/ies/article/viewFile/9712/5966

Dix, A., Finlay, J., Abowd, G.& Beale, R. (2004). *Human-Computer Interaction*. 3rd edition. England: Pearson education.

Dörnyei, Z., & Taguchi, T. (2009). *Questionnaires in second language research: Construction, administration, and processing.* Routledge.

Downes, S. (2005). E-Learning 2.0. *Elearn magazine, 2005, 10*(1). Retrieved from: http://www.downes.ca/post/31741

Downes, S. (2012). *Connectivism and connective knowledge: essays on meaning and learning methods*. National Research Council Canada. Retrieved from: http://www.downes.ca/post/58207

Drucker, P. F (1993). *Managing for the Future*. Routledge.

Dyson M. & Campello, S. (2003). Evaluating virtual learning environments: what are we measuring ? *Electronic Journal of e-Learning , 1*(1), 11-20. Retrieved from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1517-97022007000300009

Eduardo, K., Oliveira, D., & Lima, D. (2015). Educação Não Escolar, Aprendizagem Ubíqua E Novas Formas De Aprender. *Revista Interfaces Científicas - Humanas E*

Sociais, *3*(3), 41–50. Retrieved from: http://doi.org/10.17564/2316-3801.2015v3n3p41-50

Education First. (2015). *Education First English Proficiency Index*. Retrieved from: http://www.ef.edu.pt/epi/insights/english-and-innovation/

Eickelmann, B. (2011). Supportive and hindering factors to a sustainable implementation of ICT in schools. *Journal for educational research online, 3*(1), 75-103. Retrieved from: http://www.pedocs.de/volltexte/2011/4683/pdf/JERO_2011_1_Eickelmann_Supportive_and_hindering_factors_S75_D_A.pdf

El Kadri, M. S. (2015). Transformando a atividade de formação de professores/as de inglês: o uso da plataforma Fazgame para o ensino e formação de professores no contexto do PIBID. *Revista EDaPECI*, *15*(1), 102-116. Retrieved from: https://seer.ufs.br/index.php/edapeci/article/download/3707/pdf

Elliott, K. M., Hall, M. C., & Meng, J. G. (2008). Student Technology Readiness And Its Impact On Cultural Competency. *College Teaching Methods & Styles Journal*, *4*(6), 11–22.

Engeström, Y. (1987). *Learning by expanding*. Cambridge University Press. Retrieved from: http://lchc.ucsd.edu/mca/Paper/Engestrom/Learning-by-Expanding.pdf

Erstad, O. (2011). *Citizens navigating in literate worlds. Deconstructing digital natives. Young people, technology and new literacies*. New York: Routledge, 99-118.

Evans, M. (2009). *Foreign-language learning with digital technologies*. Continuum. MPG Books.

Fallows, S. J., & Bhanot, R. (2005). *Quality issues in ICT-based higher education*. London: Routledge.

Fernandes, K. T., da Trindade, G. O., Rêgo, A. H. G., de Miranda, L. C., Lucena, M. J. N. R., & Gomes, A. V. (2012). E-Learning via dispositivos móveis no Brasil: Estado da Arte e Desafios à Luz do Acesso Participativo e Universal do Cidadão Brasileiro ao Conhecimento. In *Anais do Workshop de Desafios da Computação Aplicada à Educação*. 128-137. Retrieved from: http://www.br-ie.org/pub/index.php/desafie/article/download/2783/2436

Ferreira, J. B., Silva, J. F. Da, Campos, H., Carvalho, M. L. A. De, Freitas, A. S. De, Saccol, A., & Schlemmer, E. (2012). A disseminação da aprendizagem com mobilidade (M-learning). *Datagramazero*, *13*(4), 1–21.

Fidalgo, P. S. (2012). *Learning networks and moodle use in online courses: a social network analysis study*. Tese de Doutoramento: UNL. Retrieved from: https://run.unl.pt/bitstream/10362/8862/1/Fidalgo_2012.pdf

Finardi, K. & Porcino, M. (2014). *Tecnologia e metodologia no ensino de inglês: impactos da globalização e da internacionalização*. UFES: Ilha do Desterro, 239- 282. doi: http://dx.doi.org/10.5007/2175-8026.2014n66p239

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley

Freeman, D. (1989). Teacher training, development, and decision making: A model of teaching and related strategies for language teacher education. *Tesol Quarterly, 23*(1), 27-45. Retrieved from: http://tesol.aua.am/tqd_2000/TQD_2000/TQ_D2000/Vol_23_1.pdf#page=28

Freitas, J. (2004). *Internet na educação: contributo para a construção de redes educativas com suporte computacional*. Tese de Doutoramento. Retrieved from: http://run.unl.pt/handle/10362/317

Friedman, D. A. (2011). How to Collect and Analyze Qualitative Data. *Research methods in second language acquisition: A practical guide, 13*, 180-200.

Friesen, N. (2009). *Re-thinking e-Learning research: Foundations, methods, and practices*, (333). Peter Lang.

Gardner, H. & Davis, K. (2013). *The app generation: how today's youth navigate identity, intimacy, and imagination in a digital world*. Yale University Press: USA.

Gardner, H. (1988). The theory of multiple intelligences. *Annals of Dyslexia, 37*(1), 19-35. Retrieved from: http://edu6.teacher.com.cn/ywhx023a/kcjj/ckzl/05.pdf

Garrett, J. J. (2011). *The Elements of User Experience: User-Centered Design for the Web and Beyond*, Second Edition. Jesse James Garrett. Retrieved from: http://doi.org/10.1145/889692.889709

Garrison, D. R. (2011). *E-Learning in the 21st century: A framework for research and practice*. New York: Taylor & Francis.

Gatti, E. (2005). Pesquisa, educação e pós-modernidade: confrontos e dilemas. *Cadernos de Pesquisa, 35* (126). Retrieved from: http://www.scielo.br/pdf/cp/v35n126/a04n126.pdf

Gellner, E. (1993). Nations and nationalism (New perspectives on the past). Retrieved from: http://www.citeulike.org/group/1104/article/606474

Generation. (2016). *In Merriam-Webster.com*. Retrieved from: https://www.merriam-webster.com/dictionary/generation

Gikas, J., & Grant, M. M. (2013). Mobile computing devices in higher education: Student perspectives on learning with cellphones, smartphones & social media. *The Internet and Higher Education*, *19*, 18-26.

Gilbert, J. (2007). "Catching the knowledge wave": redefining knowledge for the Post-Industrial Age. *Education Canada-Toronto, 47* (3), 4.

Gillespie, H., Boulton, H., Hramiak, A. & Williamson, R. (2007). *Learning and teaching with virtual learning environments.* Learning Matters: UK.

Gilster, P. (1997). *Digital literacy*. New York: Wiley Computer Pub.

Godwin-Jones, R. (2011). Emerging technologies: Mobile apps for language learning. *Language Learning & Technology, 15*(2), 2-11. Retrieved from: http://www.llt.msu.edu/issues/june2011/emerging.pdf

Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The qualitative report, 8*(4), 597-606. Retrieved from: http://nsuworks.nova.edu/cgi/viewcontent.cgi?article=1870&context=tqr

Golonka, E. M., Bowles, A. R., Frank, V. M., Richardson, D. L., & Freynik, S. F. (2014). Technologies for foreign language learning: A review of technology types and their effectiveness. *Computer Assisted Language Learning*, *27*(1), 70–105. Retrieved from: http://doi.org/10.1080/09588221.2012.700315

Gonçalves, L. & Sposito, M. (2002). Iniciativas públicas de redução da violência escolar no Brasil. *Cadernos de Pesquisa, 115*, 101-138. Retrieved from: http://dx.doi.org/10.1590/S0100-15742002000100004.

Graham, A., & Phelps, R. (2003). Being a teacher: Developing teacher identity and enhancing practice through metacognitive and reflective learning processes. *Australian Journal of Teacher Education, 27*(2), 11-24. Retrieved from: http://ro.ecu.edu.au/cgi/viewcontent.cgi?article=1318&context=ajte

Graham, S. (2012). *Teaching and Researching Language Learning Strategies. System* (Vol. 40). Retrieved from: http://doi.org/10.1016/j.system.2011.12.004

Green, B. A., Collier, K. J., & Evans, N. (2001). Teaching tomorrow's class today: English by telephone and computer from Hawaii to Tonga. *Distance-Learning programs*, 71-82.

Green, H. & Hannon, C. (2007) *Their space: Education for a digital generation*. Demos. Tooley London. Retrieved from: http://www.demos.co.uk/files/Their%20space%20-%20web.pdf

Gu, X., Gu, F., & Laffey, J. M. (2011). Designing a mobile system for lifelong learning on the move. *Journal of Computer Assisted Learning, 27*(3), 204-215. Retrieved from: https://www.researchgate.net/profile/James_Laffey/publication/220663272_Designing_a_mobile_system_for_lifelong_learning_on_the_move/links/02e7e519620ae1ce8c000000.pdf

Habermas, J. (1984). *The theory of communicative action*. Volume 2. Beacon Press. Boston. Retrieved from: https://teddykw2.files.wordpress.com/2012/07/jurgen-habermas-the-theory-of-communicative-action-volume-2.pdf

Halsey, A., Lauder, H., Brown, P., Wells, A. (1997). *Education: culture, economy, society*. Oxford and New York: Oxford University Press.

Hargreaves, A. (2003). Teaching in the knowledge society: education in the Age of Insecurity. *Journal of Chemical Information and Modeling.* Retrieved from: http://doi.org/10.1017/CBO9781107415324.004

Hase, S., & Kenyon, C. (2000). From andragogy to heutagogy. *Ultibase Articles, 5*(3), 1-10. Retrieved from: http://www.psy.gla.ac.uk/~steve/pr/Heutagogy.html

Heidegger, M. (1977). *The question concerning technology and other essays.* New York: Harper & Row.

Herrington, J., McKenney, S., Reeves, T., & Oliver, R. (2007). Design-based research and doctoral students: Guidelines for preparing a dissertation proposal. *ECU Publications.* Edith Cowan University. Research Online. Retrieved from: http://researchrepository.murdoch.edu.au/6762/1/design_based_doctoral.pdf

Hirumi, A. (2002). A framework for analyzing, designing, and sequencing planned e-learning interactions. *The Quarterly Review of Distance Education, 3*(2), 141–160.

Horst, H. & Miller, D. (2013). *Digital anthropology*. UK: Bloomsbury Publishing.

Hoy, T. (2011). *There's an App for That: Foreign Language Learning Through Mobile- And Social Media-Based Video Games*. Master's Dissertation, University of Tennessee. Retrieved from: http://trace.tennessee.edu/utk_gradthes/883

Hsu, L. (2013). English as a foreign language learners' perception of mobile assisted language learning: a cross-national study. *Computer Assisted Language Learning, 26*(3), 197-213. Retrieved from: http://www.tandfonline.com/doi/abs/10.1080/09588221.2011.649485

Hubbard, P., & Levy, M. (Eds.). (2006). *Teacher education in CALL (Vol. 14)*. John Benjamins Publishing.

International Monetary Fund. (2016). *World Economic Outlook*. Retrieved from: http://www.imf.org/external/pubs/ft/weo/2016/02/index.htm

Jarvis, H., & Krashen, S. (2014). Is CALL obsolete? Language acquisition and language learning revisited in a digital age. *TESL-EJ, 17*(4), n4. Retrieved from: http://files.eric.ed.gov/fulltext/EJ1024104.pdf

Jarvis, P. (2001). *Universities and corporate universities. The higher learning industry in global society*. UK: Creative Print.

Jarvis, P. (2008). *Democracy, lifelong learning and the learning society: Active citizenship in a late modern age.* (3). Routledge.

Jones, M. G., & Brader-Araje, L. (2002). The impact of constructivism on education: Language, discourse, and meaning. *American Communication Journal, 5*(3), 1-10. Retrieved from: http://ac-journal.org/journal/vol5/iss3/special/jones.pdf

Jordan, G. (2004). *Theory construction in second language acquisition (Vol. 8)*. The Netherlands: John Benjamins Publishing.

Jorge, A. (2009). *Roquette Pinto e a Rádio Sociedade do Rio de Janeiro*. Repositório Digital FGV. Retrieved from: http://bibliotecadigital.fgv.br/dspace/handle/10438/2176

Joseph, B., Corbeil, R., & Valdes-Corbeil, M. E. (2007). Are you ready for mobile learning? *Word Journal Of The International Linguistic Association*, *30*(2), 51–58. Retrieved from: http://www.learning-centric.net/mobile.cc/relatedinfo.pdf

Josgrilberg, F., & Lemos, A. (2009). *Comunicação e mobilidade: aspectos socioculturais das tecnologias móveis de comunicação no Brasil*. EDUFBA. Retrieved from: http://poscom.ufba.br/arquivos/livro_Comunicacao_Mobilidade_AndreLemos.pdf

Jurkovič, V. (2006). The Effect of a Suggested Training Program in Some Metacognitive Language Learning Strategies on Developing Listening and Reading Comprehension of university EFL Students. *English*, *3*(1), 16–27.

Kenning, M. M. (2007). ICT and language learning. In ICT and Language Learning (pp. 135-170). Palgrave Macmillan UK.

Kiliç-Çakmak, E. (2010). Learning strategies and motivational factors predicting information literacy self-efficacy of e-learners. *Australasian Journal of Educational Technology*, *26*(2). Retrieved from: http://ascilite.org.au/ajet/submission/index.php/AJET/article/viewFile/1090/345

Kim, D. H., Wang, C., Ahn, H. S., & Bong, M. (2015). English language learners' self-efficacy profiles and relationship with self-regulated learning strategies. *Learning and Individual Differences, 38*, 136-142. Retrieved from: http://www.sciencedirect.com/science/article/pii/S1041608015000333

Knowles, M. (2005). *The adult learner: a neglected species*. 6th Edition. Retrieved from: http://psycnet.apa.org/psycinfo/1980-51427-000

Kobus, M. B., Rietveld, P., & Van Ommeren, J. N. (2013). Ownership versus on- campus use of mobile IT devices by university students. *Computers & Education, 68*, 29-41. Retrieved from: http://www.sciencedirect.com/science/article/pii/S0360131513000961

Kolb, A. Y., & Kolb, D. a. (2005). The Kolb Learning Style Inventory — Version 3 . 1 2005 Technical Specifi cations. *LSI Technical Manual*, 1–72. Retrieved from: http://doi.org/10.1016/S0260-6917(95)80103-0

Kolb, D. (1984). *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice-Hall.

Kolb, D. (2005). *The Kolb learning style inventory.* Version 3.1 – Technical specifications. Haygroup. Retrieved from: http://www.whitewater-rescue.com/support/pagepics/lsitechmanual.pdf

Kondo, M., Ishikawa, Y., Smith, C., Sakamoto, K., Shimomura, H., & Wada, N. (2012). Mobile Assisted Language Learning in university EFL courses in Japan: developing attitudes and skills for self-regulated learning. *ReCALL*, *24*(2), 169–187. Retrieved from: http://doi.org/10.1017/S0958344012000055

Koole, M. L. (2009). A model for framing mobile learning. *Mobile learning: Transforming the delivery of education and training, 1*(2), 25-47. Retrieved from: http://auspace.athabascau.ca/bitstream/2149/2016/1/02_Mohamed_Ally_2009-Article2.pdf

Krashen, S. (1976). Formal and informal linguistic environment in language acquisition and language learning. *TESOL Quarterly, 10*(2). Retrieved from: http://www.jstor.org/stable/3585637

Krashen, S. (1981). *Second language acquisition and second language learning*. University of Southern California Publishing. USA.

Krashen, S. (2004). *The power of reading: insights from the research*. 2nd edition. Libraries Unlimited.

Kuhn, D. (2011). A developmental model of critical thinking. *Educational researcher, 28*(2), 16-46. Retrieved from: http://www.tc.columbia.edu/faculty/dk100/faculty-profile/files/uhn_1999_Adevelopmentalmodelofcriticalthinking.pdf

Kukulska-Hulme, A. (2009). Will mobile learning change language learning? *ReCALL*,*21*(2), 157–165. Retrieved from: http://oro.open.ac.uk/16987/2/AKH_ReCALL_Will_mobile_learning_change_language_learning.pdf

Kukulska-Hulme, A. (2010). Learning Cultures on the Move: Where are we heading?. *Educational Technology & Society, 13*(4), 4-14. Retrieved from: http://oro.open.ac.uk/25679/1/Learning_Cultures_ETS_Agnes_Kukulska-Hulme.pdf

Kukulska-Hulme, A. (2012). Language learning defined by time and place: A framework for next generation designs. In: Diaz-Vera, Javier E. *Left to My Own Devices: Learner Autonomy and Mobile Assisted Language Learning*. Bingley, UK: Emerald Group Publishing Limited , 1–13.

Kukulska-Hulme, A., & Traxler, J. (2005). *Mobile Learning: A Handbook for Educators and Trainers.* London: Routledge.

Kukulska-Hulme, A.; Sharples, M.; Milrad, M.; Arnedillo-Sanchez , I. & Vavoula, G.(2011). The genesis and development of mobile learning in Europe. In: Parsons, David ed. *Combining E-Learning and M-Learning: New Applications of Blended Educational Resources*. Hershey, PA: Information Science Reference (an imprint of IGI Global), 151–177.

Kumar, A. (2005). Developing a quality career in education using ICT. *Quality Issues in ICT-based Higher Education*, 183 - 197.

Kumaravadivelu, B. (1994). The Postmethod Condition: (E)merging Strategies for Second/Foreign Language Teaching. *TESOL Quarterly, 28*(1), 27-48. doi:10.2307/3587197

Kupperschmidt, B. (2000). Multigenerational employees: strategies for effective management. *Health Care Manager, 19*, 65–76. Retrieved from: http://www.ncbi.nlm.nih.gov/pubmed/11183655

Kurtz, R., de Macedo-Soares, T. D., Ferreira, J. B., de Freitas, A. S., & da Silva, J. F. (2015). Fatores de Impacto na Atitude e na Intenção de Uso do M-Learning: Um Teste Empírico. *Revista Eletrônica de Administração, 21*(1), 27-56. Retrieved from: http://www.seer.ufrgs.br/read/article/download/46305/33232

Kwan, R., McNaught, C., Tsang, P., Wang, F. & Li, K. (2011). Enhancing learning through technology – Education unplugged and web 2.0. *Communication in computer and information science*. Springer. 324 – 350. Retrieved from: http://www.springer.com/us/book/9783642223822

Labbas, R., & El Shaban, A. (2013). Teacher development in the Digital Age. *Teaching English with Technology*, (3), 53-64. Retrieved from: http://yadda.icm.edu.pl/yadda/element/bwmeta1.element.desklight-53be94e7-af70-4d06-9bb9-97258565214e/c/ARTICLE4.pdf

Laguardia, J., Portela, M & Vasconcellos, M. (2007). Avaliação em ambientes virtuais de aprendizagem. *Educação e Pesquisa, 33*(3), 513-530. Retrieved from: http://www.scielo.br/pdf/ep/v33n3/a09v33n3.pdf

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge university press. Retrieved from: http://www.universidad-de-la-calle.com/Wenger.pdf

Lawson, C. (2010). Technology and the extension of human capabilities. *Journal for the Theory of Social Behaviour, 40* (2), 207 – 223. Retrieved from: 10.1111/j.1468-5914.2009.00428.x

Lee, Y. H., Hsieh, Y. C., & Hsu, C. N. (2011). Adding Innovation Diffusion Theory to the Technology Acceptance Model: Supporting Employees' Intentions to use E-Learning Systems. *Educational Technology & Society, 14*(4), 124-137. Retrieved from: http://www.ifets.info/journals/14_4/ets_14_4.pdf#page=129

Leffa, V. J. (2006). Aprendizagem de línguas mediada por computador. *Pesquisa Em Linguística Aplicada: Temas E Métodos*, 11–36. Retrieved from: http://www.leffa.pro.br/textos/trabalhos/B_Leffa_CALL_HP.pdf

Lessa, L. L. (2013). Tecnologias móveis e o cenário educacional brasileiro: um estudo de caso da escola de ensino fundamental Maria Thétis Nunes. *Interfaces Científicas - Educação*, *1*(2), 69-79. Retrieved from: https://periodicos.set.edu.br/index.php/educacao/article/viewFile/593/240

Leu, D., Kinzer, C., Coiro, J., & Cammack, D. (2004). Toward a theory of new literacies emerging from the internet and other information and communication technologies. *Theoretical Models and Processes of Reading*, 1570-1613. Newark, DE: International Reading Association. Retrieved from: http://www.readingonline.org/newliteracies/leu/

Levy, M., & Kennedy, C. (2005). Learning Italian via mobile SMS. In A. Kukulska-Hulme & J. Traxler (Eds.), *Mobile Learning: A Handbook for Educators and Trainers*. London: Taylor and Francis.

Liao, P. (2006). EFL learners' beliefs about and strategy use of translation in English learning. *RELC Journal, 37*(2), 191-215. Retrieved from: http://www.posenliao.idv.tw/doc/EFL_Learners_Beliefs_about_and_Strategy_Use.pdf

Liaw, S., Hatala, M., & Huang, H. (2010). Investigating acceptance toward mobile learning to assist individual knowledge management: Based on activity theory approach. *Computers and Education*, *54*(2), 446–454. Retrieved from: http://doi.org/10.1016/j.compedu.2009.08.029

Lima, M. & Maranhão, C. (2011). Políticas curriculares da internacionalização do ensino superior: multiculturalismo ou semiformação? *Avaliação de Políticas Públicas em Educação, 19*(72), 575-598. Retrieved from: http://www.scielo.br/pdf/ensaio/v19n72/a07v19n72.pdf

Ling, R. (2004). *The mobile connection: The cell phone's impact on society*. USA: Morgan Kaufmann.

Little, D. (2007). Language learner autonomy: Some fundamental considerations revisited. *International Journal of Innovation in Language Learning and Teaching, 1*(1), 14-29. Retrieved from: http://www.languagesinitiative.ie/images/Language_Learner_Autonomy.pdf

Liu, M., Navarrete, C. C., Maradiegue, E., & Wivagg, J. (2014). Mobile learning and English language learners: A case study of using iPod touch as a teaching and learning tool. *Journal of Interactive Learning Research, 25*(3), 373-403. Retrieved from: http://www.edb.utexas.edu/liu/files/MobileLearning_ EnglishLanguageLearners_Final.pdf

Lobato, A. (2013). *As tecnologias móveis no processo de ensino e aprendizado de língua inglesa*. Dissertação de Mestrado. Universidade de Lisboa.

Long, M. H. (1990). The least a second language acquisition theory needs to explain. *Tesol Quarterly*, *24*(4), 649-666.

Loureiro, A., & Rocha, D. (2012). Literacia digital e literacia da informação-competências de uma era digital. In *Atas do ticEDUCA2012-II CongressoInternacional TIC e Educação*, 2726 - 2738. Instituto de Educação da Universidadede Lisboa. Retrieved from: http://repositorio.ipsantarem.pt/bitstream/10400.15/758/1/artigo-ticeduca2012_ana%26dina_final.pdf

Lucena, S. & Oliveira, J. (2014). Culturas digitais na educação do Século XXI. *RevistaTempos e Espaços em Educação*, 35-44. Retrieved from: http://seer.ufs.br/index.php/revtee/article/viewFile/3449/3012

Lucena, S. (2016). Culturas digitais e tecnologias móveis na educação. *Educar em Revista,* (59), 277-290. Retrieved from: http://revistas.ufpr.br/educar/article/download/43689/27731

Lüdke, M., & André, M. E. (1986). *Pesquisa em educação: abordagens qualitativas*. Retrieved from: http://www.lite.fe.unicamp.br/papet/2003/ep145/pesq.htmLyotard, J. F. (1984). *The postmodern condition: A report on knowledge* (Vol. 10).University of Minnesota Press.

Lyotard, J. F. (1984). *The postmodern condition: A report on knowledge* (Vol. 10). U of Minnesota Press. Retrieved from: http://yunus.hacettepe.edu.tr/~jason.ward/ied485britnovel4/The%20Postmodern%20Condition%20by%20Jean-Francois%20Lyotard.pdf

Lyster, R., Saito, & K. Sato. M.(2013). Oral corrective feedback in second language classrooms. *Language Teaching, 46*(1), p1-40. Retrieved from: https://www.researchgate.net/profile/Masatoshi_Sato4/publication/282668363_Lyster_Saito_Sato_2013/links/5617bb3d08ae717411a6630e.pdf

Mackey, A. & Gass, S. (2012). *Research methods in second language acquisition: a practical guide*. Wiley-Blackwell Publishing.

Maguire, M. (2010). Towards a sociology of the global teacher. *The Routledge international handbook of the sociology of education*, 58-68. Retrieved from: http://www.academia.edu/download/30999497/The_Routledge_International_Handbook_ofthe_Sociology_of_Education.pdf#page=75

Maia, M. D. C. (2003). *O uso da tecnologia de informação para a educação à distância no ensino superior* (Doctoral thesis). Rio de Janeiro: Fundação Getúlio Vargas.

Maniar, N., Bennett, E., & Gal, D. (2007). The Effect That Screen Size has on Video-Based M-Learning. In *Pervasive Computing and Communications Workshops, 2007. PerCom Workshops' 07*. Fifth Annual IEEE International Conference. 145-148. IEEE. Retrieved from: https://pdfs.semanticscholar.org/00c1/1d5b9fc4de5185d6b4c50f24dde4c6350330.pdf

Marçal, E., Andrade, R., & Rios, R. (2005). Aprendizagem utilizando dispositivos móveis com sistemas de realidade virtual. *Revista Novas Tecnologias na Educação, 3*(1). Retrieved from: http://lumenagencia.com.br/dcr/arquivos/a51_realidadevirtual_revisado.pdf

Marçalo, M. J., Fonseca, M. D. C., & Silva, A. A. (2010). ICT in higher education in Portugal. Call computer-assisted language learning. *Entreculturas, 3*, 153–162. Retrieved from: http://dialnet.unirioja.es/servlet/articulo?codigo=4091145

Marques, B. M. P. (2015). *Parâmetros de Adoção de Tecnologias de E-Learning no Ensino Superior: Um Estudo de Caso*. Tese de Doutoramento. Universidade do Porto. Retrieved from: https://repositorio-aberto.up.pt/bitstream/10216/82545/2/114884.pdf

Marsick, V. J., & Watkins, K. E. (2001). Informal and incidental learning. *New directions for adult and continuing education, 2001(89),* 25-34. Retrieved from: http://gcc.upb.de/www/WI/WI2/wi2_lit.nsf/d2f7ed56380ef2fdc125683100441206/6f9731f184cd7b3dc12570c3006303ed/$FILE/Informal+worplace+learning_Marsick.pdf

Martindale, T., & Dowdy, M. (2010). Personal learning environments. *Emerging technologies in distance education*, 177-193. Retrieved from: http://www.academia.edu/download/4936027/2009_ple.pdf

Martinho, D. S. (2014). *O ensino online nas instituições de ensino superior privado: as perspetivas docente e discente e as implicações na tomada de decisão institucional*. Tese de Doutoramento. Universidade do Minho. Retrieved from: http://repositorio.ul.pt/jspui/bitstream/10451/11686/1/ulsd068758_td_Domingos_Martinho.pdf

Martins, C. G. (2015). *Avaliação de softwares educativos para desenvolvimento da pronúncia do inglês como língua estrangeira e/ou segunda língua* (Doctoral thesis – Universidade Federal do Ceará). Retrieved from: http://repositorio.ufc.br/bitstream/riufc/13202/1/2015_tese_cgfmmartins.pdf

Martins, M. D. (2012). *Web 2.0 e a competência comunicativa em língua inglesa*. Tese de Doutoramento – Universidade de Aveiro. Retrieved from: http://ria.ua.pt/handle/10773/10455

Martins, L. L., & Kellermanns, F. W. (2004). A model of business school students' acceptance of a web-based course management system. *Academy of Management Learning & Education*, *3*(1), 7-26.

Martins, C. B. M. J., & Moreira, H. (2012). The field CALL (Computer Assisted Language Learning): definitions, aims and scope. *Calidoscópio*, *10*(3), 247. Retrieved from: http://unisinos.br/revistas/index.php/calidoscopio/article/download/3254/1280

Massard, N. & Mehier, C. (2009). Proximity and innovation through an "accessibility to knowledge" lens. *Regional Studies, 43*(01), 77-88. doi: 10.1080/00343400701808881

Mattar, J. (2013). Aprendizagem em ambientes virtuais: teorias, conectivismo e moocs. *Revista Digital de Tecnologias Cognitivas-Teccogs. 7*, 21-40. Retrieved from: http://www.pucsp.br/pos/tidd/teccogs/artigos/2013/edicao_7/2-aprendizagem_em_ambientes_virtuais-joao_mattar.pdf

Mayes, T., & De Freitas, S. (2013). Review of e-Learning theories, frameworks and models. *JISC e-Learning models desk study, (1*). Retrieved from: https://curve.coventry.ac.uk/open/file/8ff033fc-e97d-4cb8-aed3-29be7915e6b0/1/Review%20of%20e-Learning %20theories.pdf

McKenzie, R. M. (2010). *The social psychology of English as a global language: Attitudes, awareness and identity in the Japanese context (Vol. 10)*. UK: Springer Science & Business Media.

McLaughlin, B. (1990). “Conscious” versus “unconscious” learning. *TESOL quarterly*, *24*(4), 617-634. Retrieved from: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.473.7050&rep=rep1&type=pdf#page=15

Meirelles, L. & Tarouco, L. (2005). Framework para aprendizagem com mobilidade. In *Anais do Simpósio Brasileiro de Informática na Educação, 1* (1). 623-633. Retrieved from: http://www.br-ie.org/pub/index.php/sbie/article/download/446/432

Meirelles, L., Tarouco, L., & Alves, C. (2004). Telemática aplicada à aprendizagem com mobilidade. *RENOTE-Revista Novas Tecnologias na Educação, Porto Alegre, 2*(2). Retrieved from: http://www.inf.ufes.br/~cvnascimento/artigos/a13_telematica-aplicada.pdf

Milojevic, I. (2003). Hegemonic and marginalized educational utopias in the contemporary western world. *Policy Futures in Education, 1*(3). Retrieved from: http://pfe.sagepub.com/content/1/3/440.full.pdf

Mitchell, R. (1994). The communicative approach to language teaching. *Teaching modern languages*, 33-42.

Mitra, S. (2006). *The hole in the wall: Self-organising systems in education*. New York NY. Retrieved from: http://www.gg.rhul.ac.uk/ict4d/workingpapers/Mitra1.pdf

Moore, G. & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information systems research, 2*(3), 192-222. Retrieved from: http:/pages.cpsc.ucalgary.ca/~boyd/699/mitchell/Moore%20and%20Benbasat.pdf

Moura, A & Carvalho, A. (2011). Aprendizagem mediada por tecnologias móveis: novos desafios para as práticas pedagógicas. *Universidade Do Minho*, *d*, 14. Retrieved from: http://repositorium.sdum.uminho.pt/handle/1822/15942

Moura, A. (2001). Jogos eletrónicos para aprendizagem curricular em língua materna e estrangeira Electronic games for curricular learning in mother and foreign languages. Graphics, *Interaction and Learning Technologies-GILT*. Retrieved from: https://www.researchgate.net/profile/Adelina_Moura/publication/0f31753b08478096a3000000.pdf

Moura, A. (2011). *A apropriação do telemóvel como ferramenta de mediação em mobile learning : estudos de caso em contexto educativo.* Doctoral Dissertation. Universidade do Minho. Retrieved from: http://hdl.handle.net/1822/13183

Moura, A. (2014). Jogos eletrónicos para aprendizagem curricular em língua materna e estrangeira. *Iberian Conference on Information Systems and Technologies, CISTI*, (June). Retrieved from: http://doi.org/10.1109/CISTI.2014.6877016

Mozzaquatro, P. & Medina, R. (2008). Avaliação do ambiente virtual de aprendizagem moodle sob diferentes visões: aspectos a considerar. *Novas Tecnologias na* Educação *UFRGS, 6* (2). Retrieved from: http://seer.ufrgs.br/renote/article/view/14508

Müller, D. (2012). *Design characteristics of virtual learning environments: a theoretical integration and empirical test of technology acceptance and IS research*. Springer

Gabler Research. Retrieved from: http://www.springer.com/br/book/9783658003913#otherVersion=9783658003920

Mun, Y. Y., & Hwang, Y. (2003). Predicting the use of web-based information systems: self-efficacy, enjoyment, learning goal orientation, and the technology acceptance model. *International journal of human-computer studies, 59*(4), 431-449. Retrieved from: http://sighci.org/Research/ijhcs_03/Yi.pdf

Murray, G., Gao, X. A., & Lamb, T. (2011). Identity, motivation and autonomy in language learning (54). *Multilingual Matters*. UK: Short Run Press.

Nation, I. & Macalister, J. (2010). *Language curriculum design*. Taylor & Francis Group. New York, USA.

Nikou, S. A., & Economides, A. A. (2014). A model for Mobile-based Assessment adoption based on Self-Determination Theory of Motivation. In *Interactive Mobile Communication Technologies and Learning (IMCL), 2014 International Conference* 86-90. IEEE. Retrieved from: http://conta.uom.gr/conta/publications/PDF/TAM-SDT2%20(2).pdf

Noels, K. A., Pelletier, L. G., Clément, R., & Vallerand, R. J. (2000). Why are you learning a second language? Motivational orientations and self-determination theory. *Language learning, 50*(1), 57-85. Retrieved from: http://www.psych.ualberta.ca/~knoels/personal/Kim's%20publications/NoelsPelletierClementVallerand2000.pdf

Norbrook, H., & Scott, P. (2003). Motivation in mobile modern foreign language learning. *In MLEARN*. 50-51. Retrieved from: http://pegasus.javeriana.edu.co/~sdmovil/recursos/LearningWithMobileDevices.pdf#page=59

Nóvoa, A. (2009). Educación 2021: para una historia del futuro. *Revista iberoamericana de educación, 49*, 181-199. Retrieved from: https://dialnet.unirioja.es/servlet/articulo?codigo=2954962

Nunan, D., & Choi, J. (Eds.). (2010). *Language and culture: Reflective narratives and the emergence of identity*. Routledge.

O'Malley, C., Vavoula, G., Glew, J., Taylor, J., Sharples, M. & Lefrere, P. (2003). *Guidelines for learning/teaching/tutoring in a mobile environment*. Mobilearn project deliverable. Retrieved from: http://www.mobilearn.org/download/results/guidelines.pdf

Oblinger, D. G. (2006). *Learning Spaces*. *British Journal of Educational Technology* (Vol. 41). Retrieved from: http://doi.org/10.1111/j.1467-8535.2009.00974.x

Oblinger, D., Oblinger, J. L., & Lippincott, J. K. (2005). *Educating the net generation*. Boulder, Colorado: EDUCAUSE.

Oliveira, L. (2004). *A comunicação educativa em ambientes virtuais: um modelo de design de dispositivos para o ensino-aprendizagem na universidade*. Dissertação de Doutoramento – Universidade do Minho. Retrieved from: http://repositorium.sdum.uminho.pt/handle/1822/7672

Onoda, S. (2011). *Examining the Relationships between Self-Efficacy, Effort Regulation Strategy Use, and English Vocabulary Skills*. Reading. Retrieved from: https://sisaljournal.org/archives/dec14/onoda/

Ortega, L. M., & Bagnato, V. S. (2015). The practice of innovation at Brazilian public university: the case of the University of São Paulo. *Brazilian Journal of Science and Technology, 2*(1), 1-15. Retrieved from: http://link.springer.com/article/10.1186/s40552-015-0011-2/fulltext.html

Paiva, V. M. (2010). Ambientes virtuais de aprendizagem: implicações epistemológicas. *Educação em Revista, 26*(3), 353-370. Retrieved from: http://www.scielo.br/pdf/edur/v26n3/v26n3a18

Phakiti, A. (2014). *Experimental research methods in language learning*. Bloomsbury Publishing.

Papert, S. (1990). *A critique of technocentrism in thinking about the school of the future*. Epistemology and Learning Group, MIT Media Laboratory. Retrieved from: http://www.papert.org/articles/ACritiqueofTechnocentrism.html

Papert, S. (1996*). The connected family: bridging the digital generation gap*. USA: Longstreet Press.

Parasuraman, A. (2000). Technology Readiness Index (TRI) a multiple-item scale to measure readiness to embrace new technologies. *Journal of service research, 2*(4), 307-320. Retrieved from: http://journals.sagepub.com/doi/abs/10.1177/109467050024001

Parasuraman, A., & Colby, C. (2015). An updated and streamlined technology readiness index TRI 2.0. *Journal of service research, 18*(1), 59-74. Retrieved from: http://jsr.sagepub.com/content/18/1/59.short

Park, M., & Slater, T. (2013). A Typology of Tasks for Mobile-Assisted Language Learning: Recommendations from a Small-Scale Needs Analysis. *TESL Canada Journal*, *31*, 93–115. Retrieved from: http://eric.ed.gov/?id=EJ1052104

Park, Y. (2009). An Analysis of the Technology Acceptance Model in Understanding University Students' Behavioral Intention to Use e-Learning . *Educational technology & society, 12*(3), 150-162. Retrieved from: http://www.academia.edu/download/8820111/ets_12_3.pdf#page=155

Park, Y. (2014). A pedagogical framework for mobile learning: categorizing educational applications of mobile technologies into four types. *International Review of Research in Open and Distance Learning – IRRODL, 12*(2). Retrieved from: http://www.irrodl.org/index.php/irrodl/article/view/791/1699

Pelissoli, L., & Loyola, W. (2004). Aprendizado móvel (M-Learning): dispositivos e cenários. In *Actas do Congresso Internacional de Educação a Distância*, Brasil. Retrieved from: http://www. abed. org. br/congresso2004/por/htm/074-TC-C2. htm

Pellerin, M. (2014). Language tasks using touch screen and mobile technologies: reconceptualizing task-based CALL for young language learners. *Canadian Journal of learning and Technology*, *40*(1), n1.

Peña-Ayala, A. (2014). *Educational Data Mining: Applications and Trends. Studies in Computational Intelligence*. Retrieved from: http://doi.org/10.1007/978-3-319-02738-8

Pennington, M. C. (2002). Teacher identity in TESOL. *Advances and Current Trends in Language Teacher Identity Research, 5*, 16.

Pennycook, A. (2001). *Critical applied linguistics*: A critical introduction. UK: Routledge. .

Perez, G., Zilber, M. A., Cesar, A. M. R. V. C., Lex, S., & Medeiros Jr, A. (2012). Tecnologia de informação para apoio ao ensino superior: O uso da ferramenta moodle por professores de ciências contábeis. *Revista de Contabilidade e Organizações, 6*(16), 143. Retrieved from: http://www.periodicos.usp.br/rco/article/viewFile/52671/56555

Peters, M. & Humes, W. (2003). Editorial: education in the knowledge economy, *Policy Futures in Education, 1*, 1-19. Retrieved from: http://pfe.sagepub.com/content/1/3/440.full.pdf

Phakiti, A. (2014). *Experimental Research Methods in Language Learning*. London, England: Bloomsbury Publishing.

Phillipson, R. (1997). Realities and myths of linguistic imperialism. *Journal of Multilingual and Multicultural Development, 18* (3), 238-248. doi: 10.1080/01434639708666317

Phillipson, R. (2008). *English, panacea or pandemic? Language Issues in English- medium universities*. University of Hong Kong. Retrieved from: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.465.3&rep=rep1&type=pdf

Picciano, A. G. (2002). Beyond student perceptions: Issues of interaction, presence, and performance in an online course. *Journal of Asynchronous learning networks, 6*(1), 21-40. Retrieved from: http://datateca.unad.edu.co/contenidos/551025/PERFORMANCE_IN_AN_ONLINE_COURSE-1.pdf

Pilar, R. A., Jorge, A., & Cristina, C. (2013). The use of current mobile learning applications in EFL. *Procedia-Social and Behavioral Sciences, 103*, 1189-1196. Retrieved from: http://www.sciencedirect.com/science/article/pii/S1877042813038913

Pinho, J. C. M. R., & Soares, A. M. (2011). Examining The Technology Acceptance Model in The Adoption of Social Networks. *Journal of Research in Interactive Marketing*, *5*(2/3), 116–129. Retrieved from: http://doi.org/10.1108/17505931111187767

Pinto, A. M. (2004). As novas tecnologias e a educação. *ANPED SUL, 6*, 1-7. Retrieved from: http://www.portalanpedsul.com.br/admin/uploads/2004/Poster/Poster/04_53_48_AS_NOVAS_TECNOLOGIAS_E_A_EDUCACAO.pdf

Pinto, M. (2010). Design of the IL-HUMASS survey on information literacy in higher education: A self-assessment approach. *Journal of Information Science, 36*(1), 86-103.

Pintrich, P.(2004). A conceptual framework for assessing motivation and self-regulated learning in college students. *Educational Psychology Review, 16*(4), 385-407. Retrieved from: https://deepblue.lib.umich.edu/bitstream/handle/2027.42/44454/

Pires, P. J., & Costa Filho, B. A. (2008). Fatores do índice de prontidão à tecnologia (TRI) como elementos diferenciadores entre usuários e não usuários de internet banking e como antecedentes do modelo de aceitação de tecnologia (TAM). *Revista de Administração Contemporânea, 12*(2), 429-456. Retrieved from: http://www.scielo.br/pdf/rac/v12n2/a07v12n2

Polio, C. G. (1997). Measures of linguistic accuracy in second language writing research. *Language learning, 47*(1), 101-143. Retrieved from: http://people.ucsc.edu/~ktellez/poliowritingmeasures.pdf

Pollara, P. (2011). *Mobile learning in Higher Education: A Glimpse and a comparison of student and faculty readiness, attitudes and perceptions.* (Doctoral dissertation, Duquesne University). Retrieved from: http://etd.lsu.edu/docs/available/etd-11042011-105812/unrestricted/PollaraFinalDissertation.pdf

Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon, 9*(5). Retrieved from: http://www.marcprensky.com/writing/Prensky%20-20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf

Prisacariu, A. (2015). *New perspectives of quality assurance in European higher education.* Procedia Social and Behavioral Sciences: Elsevier. Retrieved from: http://www.sciencedirect.com/science/article/pii/S1877042815014251

Pulido, D. (2003). Modeling the role of second language proficiency and topic familiarity in second language incidental vocabulary acquisition through reading. *Language Learning, 53*(2), 233-284. Retrieved from: https://www.researchgate.net/profile/Diana_Pulido5/publication/227507450_Modeling_the_Role_of_Second_Language_Proficiency_and_Topic_Familiarity_in_Second_La

nguage_Incidental_Vocabulary_Acquisition_Through_Reading/links/54b404c50cf28ebe92e449a1.pdf

Rahamat, R., Shah, P., Din, R., & Aziz, J. A. (2011). *Students' readiness and perceptions towards using mobile technologies for learning the English language literature components*. Retrieved from: https://pdfs.semanticscholar.org/8667/dcffc97e29dbc59854765c79e87a2a747941.pdf

Rahimi, M., & Katal, M. (2012). The role of metacognitive listening strategies awareness and podcast-use readiness in using podcasting for learning English as a foreign language. *Computers in Human Behavior*, *28*(4), 1153-1161.

Ramos, J. L., & Espadeiro, R. G. (2014). Os futuros professores e os professores do futuro. Os desafios da introdução ao pensamento computacional na escola, no currículo e na aprendizagem. *Educação, Formação & Tecnologias - ISSN 1646-933X*, *7*(2), 4–25.

Ramos, P., Giannella, T. R., & Struchiner, M. (2010). A pesquisa baseada em design em artigos científicos sobre o uso de ambientes de aprendizagem mediados pelas tecnologias da informação e da comunicação no ensino de ciências. Alexandria: *Revista de Educação em Ciência e Tecnologia, 3*(1), 77-102. Retrieved from: https://periodicos.ufsc.br/index.php/alexandria/article/download/38016/29016

Reeves, T. (2006). Design research from a technology perspective. *Educational design research*, 52-66. London: Routledge. Retrieved from: http://ro.ecu.edu.au/cgi/viewcontent.cgi?article=2611&context=ecuworks

Richards, J. C., & Schmidt, R. W. (2013). *Longman dictionary of language teaching and applied linguistics*. UK: Routledge.

Robinson, K. (2013). *Finding your element: How to discover your talents and passions and transform your life*. UK: Penguin.

Robinson, K., Minkin, L., & Bolton, E. (1999). National Advisory Committee on Creative and Cultural Education All Our Futures : Creativity , Culture and Education. *DfEE Report*, *16*(May), 1–243. Retrieved from: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.115.1660&rep=rep1&type=pdf

Rogers, E, Singal, A. & Quinlan, M. (2006). Diffusion of innovations. In Don Stacks and Michael Salwen (Eds). *An integrated approach to communication theory and research*. New York: Routledge, 1-25. Retrieved from: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.624.8412&rep=rep1&type=pdf

Rogers, E. (1983). *Diffusion of innovations*. 3rd edition. Collier Macmillan.

Ronau, R. N., Rakes, C. R., & Niess, M. (2012). *Educational technology, teacher knowledge, and classroom impact.* USA: Information Science Reference.

Saccol, A. Z., & Reinhard, N. (2007). Tecnologias de informação móveis, sem fio e ubíquas: definições, estado-da-arte e oportunidades de pesquisa. *Revista de administração contemporânea, 11*(4), 175-198. Retrieved from: http://www.scielo.br/pdf/rac/v11n4/a09v11n4.pdf

Sahin, I. (2006). Detailed review of Rogers' diffusion of innovations theory and educational technology-related studies based on Rogers' theory. *TOJET: The Turkish Online Journal of Educational Technology*, *5*(2). Retrieved from: http://files.eric.ed.gov/fulltext/EJ1102473.pdf

Sampson, D., Isaias, P., Ifenthaler, D & Spector, J. (2013). *Ubiquitous and mobile learning in the digital age*. Springer Media. Retrieved from: 10.1007/978-1-4614-3329-3

Santaella, L. (2009). A aprendizagem ubíqua substitui a educação formal? *Revista de Computação E Tecnologia Da PUC-SP*, *2*(1), 17–22. Retrieved from: http://www.eprofessor.com.br/moodle/pluginfile.php/7952/mod_resource/content/3/educacao_ubiqua.pdf

Santana, C., Pontes, I., Nunes, M. & Silva, R. (2012). Aplicando traços de acessibilidade e usabilidade web móvel na Universidade Federal de Sergipe: respeito à cidadania e à inclusão digital. *GEINTEC-Gestão, Inovação e Tecnologias, 2*(5), 445-464. Retrieved from: http://www.revistageintec.net/portal/index.php/revista/article/viewFile/68/140

Santos, T., Beato, Z. & Aragão, R. (2012). As TIC e o ensino de línguas. In *Anais do III SEPEXLE*. Retrieved from: http://www.uesc.br/eventos/sepexle/anais/10.pdf

Sarker, S., & Wells, J. (2003). Understanding mobile handheld device use and adoption. *Communications of the ACM, 46*(12), 35-40. Retrieved from: http://www.jpkc.fudan.edu.cn/picture/article/217/57/89/b0edb649422587f87d5e7abbb80c/6a31ac41-b06a-4355-984f-2dbefee6762e.pdf

Schlindwein, A. & Sorte, P. (2016). Tecnologias na aula de inglês: panorama histórico – Aula 4. *Tecnologias no Ensino de Língua Inglesa*. Retrieved from: http://www.cesadufs.com.br/ORBI/public/uploadCatalago/11511327052016Tecnologias_no_ensino_de_lingua_inglesa_Aula_04.pdf

Schofield, M., Sackville, A., & Davey, J. (2006). Managing Learning in Virtual Settings. *Managing Learning in Virtual Settings: The Role of Context*. doi.org/10.4018/978-1-59140-488-0

Schunk, D. H. (2012). *Learning theories*. Printice Hall Inc., New Jersey. Retrieved from: http://server2.docfoc.com/uploads/Z2015/12/26/1koY3p4pMU/5a9f4b6679bd468fb0e9a9d541487e09.pdf

Sha, L., Looi, C. K., Chen, W., & Zhang, B. H. (2012). Understanding mobile learning from the perspective of self-regulated learning. *Journal of Computer Assisted Learning, 28*(4), 366-378. doi: 10.1111/j.1365-2729.2011.00461

Sharples, M. (2000). The design of personal mobile technologies for lifelong learning. *Computers & Education, 34*(3), 177-193. Retrieved from: https://pdfs.semanticscholar.org/576d/05b4252914

Sharples, M., Taylor, J., & Vavoula, G. (2010). A theory of learning for the mobile age. *In Medienbildung in neuen Kulturräumen.* 87-99. VS Verlag für Sozialwissenschaften. Retrieved from: https://telearn.archives-ouvertes.fr/hal-00190276/en/

Sherman, R. R., & Webb, R. B. (2005). Qualitative research in education: Focus and methods (Vol. 3). *Psychology Press*. Retrieved from: http://idr.iain-antasari.ac.id/473/1/kualitatifrisetEDUCATION.pdf

Shorfuzzaman, M., & Alhussein, M. (2016). *Modeling Learners' Readiness to Adopt Mobile Learning: A Perspective from a GCC Higher Education Institution*. Mobile Information Systems, 2016. Retrieved from: http://downloads.hindawi.com/journals/misy/2016/6982824.pdf

Siemens, G. (2005). *Connectivism: A learning theory for the digital age*. Retrieved from: http://er.dut.ac.za/bitstream/handle/123456789/69/Siemens_2005_Connectivism_A_learning_theory_for_the_digital_age.pdf?sequence=1

Siemens, G. (2006). *Knowing knowledge*. Creative Commons licensed. Retrieved from: http://www.elearnspace.org/KnowingKnowledge_LowRes.pdf

Silva, A. A., Gomes, F., & Marçalo, M. J. (2013). *20 Years of Eurocall: Learning from the Past, Looking to the future*. Retrieved from: http://dspace.uevora.pt/rdpc/bitstream/10174/9691/1/Eurocall%202013.pdf

Silva, B., Araújo, A., Vendramini, C., Martins, R., Piovezan, N., Prates, E., & Joly, M. C. (2014). Aplicação e uso de tecnologias digitais pelos professores do ensino superior no Brasil e em Portugal. *Educação, Formação & Tecnologias, 7*(1), 3-18. Retrieved from: http://eft.educom.pt/index.php/eft/article/download/424/195

Skinner, B. F. (1953). Science and human behavior. Simon and Schuster. Song, Y., & Fox, R. (2005). Integrating m-technology into Web-based ESL vocabulary learning for working adult learners. In *IEEE International Workshop on Wireless and Mobile Technologies in Education (WMTE'05). IEEE*. Retrieved from: http://hub.hku.hk/bitstream/10722/47024/1/123755.pdf?accept=1

Slattery, P. (2006). *Curriculum development in the post-modern era*. Taylor & Francis Group. New York.

Sousa, J. & Fino, C. (2007). Inovação e incorporação de novos saberes: o desenho curricular de um mestrado em Inovação Pedagógica. In *Actas do VIII Congresso da SPCE, Cenários da educação/ formação: Novos espaços, culturas e saberes*. Retrieved from: http://www3.uma.pt/carlosfino/publicacoes/Mestrado_IP.pdf

Souza, A. A. (2013). O Twitter como recurso didático em aulas de Língua Portuguesa. *Interfaces Científicas-Educação, 1*(3), 85-95. Retrieved from: https://periodicos.set.edu.br/index.php/educacao/article/viewFile/673/413

Souza, R. V. D., & Luce, F. B. (2005). Avaliação da aplicabilidade do technology readiness index (tri) para a adoção de produtos e serviços baseados em tecnologia. *Revista de Administração Contemporânea*, *9*(3), 121-141. Retrieved from: http://doi.org/10.1590/S1415-65552005000300007

Stald, G. (2008). *Youth, Identity, and Digital Media*. *Digital Media*. Retrieved from: http://doi.org/10.1162/dmal.9780262524834.vii

Stald, G., Mulgan, G., Martins, F., Leite, C., Freitas, J. C. de, Cardoso, S., … Abrantes, S. L. (2014). Unified Theory of Acceptance and Use of Technology (UTAUT): A Decade of Validation and Development. *Revista Brasileira de Informática Na Educação*, *27*(1), 80–88. Retrieved from: http://doi.org/10.1590/0034-7612140185

Stevenson, M. P., & Liu, M. (2010). Learning a language with web 2.0: Exploring the use of social networking features of foreign languagelLearning websites. *Computer-Assisted Language Instruction Consortium Journal*, *27*(2), 233–259. Retrieved from: doi.org/10.11139/cj.27.2.233-259

Stockwell, G. (2010). Using mobile phones for vocabulary activities: examining the effect of the platform. *About Language Learning & Technology*, 95. Retrieved from: http://scholarspace.manoa.hawaii.edu/bitstream/10125/44216/1/14_02_stockwell.pdf

Straub, E. (2009). Understanding technology adoption: theory and future direction for informal learning. *Review of Educational Research, 79* (2), 625–649. Retrieved from: 10.3102/0034654308325896

Suwantarathip, O. (2015). Using Mobile-Assisted Exercises To Support Students', *TOJET: The Turkish Online Journal of Educational Technology 14*(1), 163–171. Retrieved from: http://files.eric.ed.gov/fulltext/EJ1057347.pdf

Tapscott, D. (1998). *Growing up digital: The rise of the net generation*. New York: McGraw-Hill.

Tapscott, D. (2009). *Grown up digital: how the net generation is changing your world.* New York: McGraw-Hill.

Teles, V. D. (2013). A análise de um objeto de aprendizagem em dispositivo móvel: vocabulário em língua inglesa. Dissertação de Mestrado. Universidade Federal de Pernambuco. Retrieved from: http://repositorio.ufpe.br/bitstream/handle/123456789/11291/Disserta%C3%A7ao%20Vivianny%20Teles.pdf?sequence=1

Thomas, M. (2011). *Deconstructing digital natives: Young people, technology, and the new literacies*. Taylor & Francis.

Thornton, P., & Houser, C. (2003). Using mobile web and video phones in English language teaching: Projects with Japanese college students. *Directions in CALL: Experience, experiments & evaluation*, 207-224.

Thornton, P., & Houser, C. (2005). Using mobile phones in English Education in Japan. *Journal of Computer Assisted Learning, 21*, 217-228.

Tobergte, D. R., & Curtis, S. (2013). *Self Efficacy in Changing Societies*. *Journal of Chemical Information and Modeling* (Vol. 53). Retrieved from: http://doi.org/10.1017/CBO9781107415324.004

Tonoian, L. (2014). *English language learning inside and outside the classroom in Portugal*. Trabalho de projeto de Mestrado em Didática do Inglês. Faculdade de Ciências Sociais e Humanas. Retrieved from: http://run.unl.pt/bitstream/10362/13616/1/Trabalho%20de%20projecto.%20Final.%20Lilit%20Tonoian%20%28Didactica%29%20%283%29.pdf

Traxler, J. (2009). Learning in a mobile age. *International Journal of Mobile and Blended Learning, 1*(1), 1-12. Retrieved from: https://www.academia.edu/171500/Learning_in_a_Mobile_Age

Traxler, J. (2013). Mobile learning for languages: Can the past speak to the future? Monterey, CA: *The International Research Foundation for English Language Education.* Retrieved from: http://www.tirfonline.org/english-in-the-workforce/mobile-assisted-language-Learning /

Traxler, J., Barcena, E., & Laborda, J. (2015). Mobile technology for foreign language teaching: building bridges between non-formal and formal scenarios. *Journal of Universal Computer Science, 21* (10), 1234 – 1247. Retrieved from: http://www.jucs.org/jucs_21_10/mobile_technology_for_foreign/abstract.html

Trochim, W. M. (2006). *The Research Methods Knowledge Base*, 2nd Edition. Retrieved from: http://www.socialresearchmethods.net/kb/

Underwood, J. H. (1984). *Linguistics, Computers, and the Language Teacher. A Communicative Approach*. Newbury House Publishers, Inc., Rowley, MA 01969.

Usher, R. & Edwards, R. (2003). *Postmodernism and education: Different voices, different worlds*. Routledge.

Valk, J., Rashid, A., & Elder, L. (2010). Using mobile phones to improve educational outcomes: an analysis of evidence from Asia. *International Review of Research in Open and Distance Learning*, 117–140. Retrieved from: http://www.irrodl.org/index.php/irrodl/article/view/794/1487

van den Akker, J., Gravemeijer, K., McKenney, S., & Nieveen, N. (2006). Introducing educational design research. *Educational design research, 3*(7). London: Routledge. Retrieved from: http://ro.ecu.edu.au/cgi/viewcontent.cgi?article=2611&context=ecuworks

Van Patten, B., & Williams, J. (2014). *Theories in second language acquisition: An introduction*. Routledge: UK. Retrieved from: http://tesl-ej.org/ej46/r6.html

Van Raaij, E. M., & Schepers, J. J. (2008). The acceptance and use of a virtual learning environment in China. *Computers & Education, 50*(3), 838-852. Retrieved from: https://www.researchgate.net/profile/Erik_Van_Raaij2/publication/222575944_The_acceptance_and_use_of_a_virtual_learning_environment_in_China/links/02e7e5242918fefe29000000.pdf

van Vlack, S. (2010). Second Language Learning Theories. *Journal of Sociolinguistics, 6*(2), 176-206.

Veiga, A. & Amaral, A. (2009). *Survey on the implementation of the Bologna process in Portugal*. Higher Education: Springer. doi:10.1007/s10734-008-9132-6

Veletsianos, G. (2010). *Emerging technologies in distance education*. AU Press. Athabasca University. Retrieved from: http://www.icde.org/filestore/News/2004-2010/2010/G.Veletsianose-bookEmergingTechnologies.pdf

Venkatesh, V. (1999). Creation of favorable user perceptions: Exploring the role of intrinsic motivation. *MIS quarterly*, 239-260. Retrieved from: http://www.jstor.org/stable/249753

Venkatesh, V. & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. *Decision sciences, 39*(2), 273-315. Retrieved from:

http://www.vvenkatesh.com/wp-content/uploads/2015/11/Venkatesh_Bala_DS_2008.pdf

Venkatesh, V. & Davis, F. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management science, 46*(2), 186-204. Retrieved from: http://www.academia.edu/download/42921312/20002_MS_Venkatesh_Davis_ext_TAM_NO.pdf

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly*, 425-478. Retrieved from: http://www.academia.edu/download/28342498/sciencewatch.pdf

Verhagen, P. (2006). *Connectivism: A new learning theory?* Retrieved from: http://elearning.surf.nl/e-learning/english/3793

Vieira, L, Coutinho, C., Graça, J. & Graça, J. (2014). The implementation of mobile location based-games and QR codes: the case of Mobigeo. *INTED 2014 Conference Proceedings.* Retrieved from: http://repositorium.sdum.uminho.pt/handle/1822/28526

Vilaça, M. (2010). Educação à distância e tecnologias: conceitos, termos e um pouco de história. Revista Magistro: *Unigranrio, 2* (1), 89-101. Retrieved from: http://publicacoes.unigranrio.edu.br/index.php/magistro/article/view/1197/801

Vygotsky, L. S. (1986). Thought and language. Cambridge: The M.I.T. Press.

Wang, Y. & Young, S. (2014). A Study of the Design and Implementation of the ASR-based iCASL System with Corrective Feedback to Facilitate English Learning. *Educational Technology & Society, 17* (2), 219–233. Retrieved from: https://www.learntechlib.org/p/156068

Wang, Y. S., Wu, M. C., & Wang, H. Y. (2009). Investigating the determinants and age and gender differences in the acceptance of mobile learning. *British Journal of Educational Technology*, *40*(1), 92–118. doi.org/10.1111/j.1467-8535.2007.00809.x

Warschauer, M., & Healey, D. (1998). Computers and language learning: An overview. *Language teaching, 31*(02), 57-71. Retrieved from: http://hstrik.ruhosting.nl/wordpress/wp-content/uploads/ 2013/03/Warschauer-Healey-1998.pdf

Warschauer, M. (2003). Dissecting the ‘‘Digital Divide’’: A Site in Egypt’. *The Information Society 19*, 297–304. Retrieved from: http://education.uci.edu/person/warschauer_m/docs/dissecting.pdf

Waters, A. (2009). Managing innovation in English language education. *Language Teaching, 42*(04), 421-458. Retrieved from: http://eprints.lancs.ac.uk/33324/1/download.pdf

Weber, A. & Santos, E. (2013). Educação Online em tempos de mobilidade e aprendizagem ubíqua: desafios para as práticas pedagógicas na cibercultura. *Revista EDaPECI, 13*(2), 168-183. Retrieved from: http://www.seer.ufs.br/index.php/edapeci/article/view/1597

Weller, M. (2007). *Virtual learning environments: using, choosing and developing your VLE*. Routledge. Taylor & Francis e-library.

Weller, M. (2011). *The digital scholar: how technology is transforming scholarly practice*. Bloomsbury Publishing. London, UK

Wenger, E. (2010). Communities of practice and social learning systems: the career of a concept. In *Social learning systems and communities of practice*. 179-198. Springer London. Retrieved from: http://wenger-trayner.com/wp-content/uploads/2012/01/09-10-27-CoPs-and-systems-v2.01.pdf

Widdowson, H. G. (1989). Knowledge of language and ability for use. *Applied linguistics*, *10*(2), 128-137.

Wilks, S. (2005). *Designing a thinking curriculum*. Shannon Books. 2nd Edition.

Winne, P. H., & Hadwin, A. F. (1998). Studying as self-regulated learning. *Metacognition in educational theory and practice*, *93*, 27-30. Retrieved from: https://www.researchgate.net/profile/Philip_Winne/publication/315756117_Studying_as_Self-Regulated_Learning/links/58e259e8aca272059ab57d6a/Studying-as-Self-Regulated-Learning.pdf

Wu, Q. (2015). Pulling mobile assisted language learning (MALL) into the mainstream: MALL in broad practice. *PloS one, 10*(5), e0128762. Retrieved from: http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0128762

York, C., & Turcotte, J. (2015). Vacationing from Facebook: Adoption, Temporary Discontinuance, and Readoption of an Innovation. *Communication Research Reports, 32*(1), 54-62. Retrieved from: http://www.tandfonline.com/doi/full/10.1080/08824096.2014.989975

Zafar, M. (2011). Monitoring the 'monitor': A critique of Krashen's five hypotheses. *Dhaka University Journal of Linguistics, 2*(4), 139-146. Retrieved from: http://www.banglajol.info/bd/index.php/DUJL/article/download/6903/5484

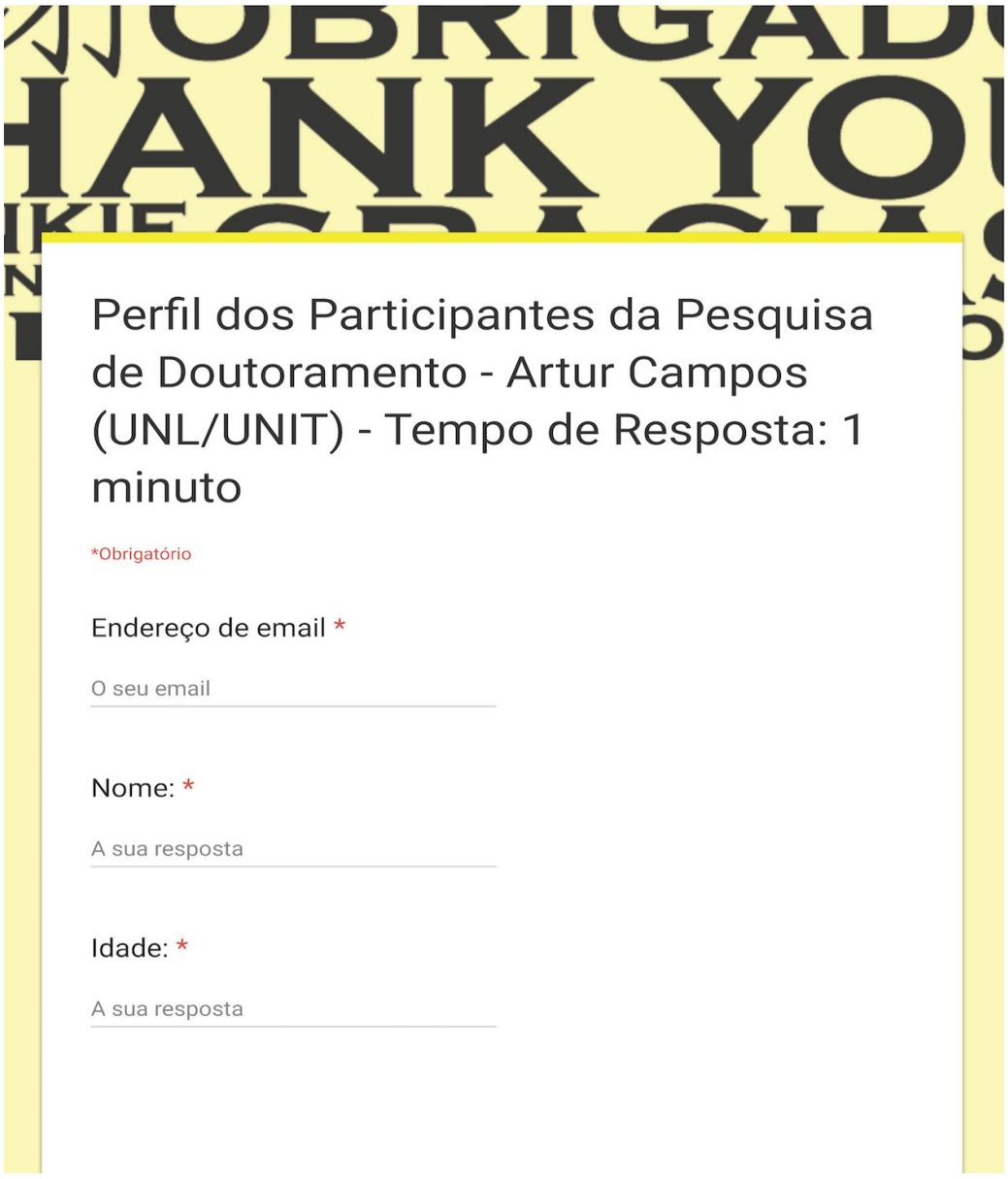
Zhang, F. (2012). *Computer-enhanced and mobile-assisted language learning*. Information Science Reference.

Zimmerman, B. J. (2008). Investigating self-regulation and motivation: Historical background, methodological developments, and future prospects. *American educational research journal, 45*(1), 166-183.

Zimmerman, B., Bonner, S. & Kovach, R. (1996). *Developing self-regulated learners: beyond achievement for self-efficacy.* Psychology in the Classroom. American Psychological Association. Washington: USA.

ANNEXES

Annex 1 – Questionnaire 1



Curso Universitário: *

A sua resposta

1 - Qual a sua razão principal para você estudar Inglês ? *

- ◯ Viagens.
- ◯ Desenvolvimento da Carreira Profissional.
- ◯ Entretenimento: filmes, música, leitura, artes.
- ◯ Pós-Graduação: Mestrado e Doutorado.

2 - Como você se sente em relação ao uso do celular/telemóvel para atividades de aprendizagem? *

- ◯ Sou muito interessado e já utilizei (escola/universidade) e me sinto confortável
- ◯ Estou muito interessado em tentar, já que tenho um celular/telemóvel.
- ◯ Estou inclinado a tentar, “vamos ver!”
- ◯ Acho que será, pessoalmente, muito desafiador.

3 - Qual é a maior vantagem em aprender Inglês com os celulares/telemóveis? *

- ◯ Estar fora do ambiente formal de aprendizagem: em casa, no ônibus/comboio, at work, etc.
- ◯ Posso aprender no meu ritmo próprio e não no ritmo das aulas.
- ◯ Gosto de formatos de aprendizagem que englobam tecnologias.
- ◯ Custo muito baixo.

04 - Qual sua disponibilidade (tempo) para aprender Inglês nos apps da pesquisa? *

- ◯ 8 horas por semana
- ◯ 6 horas por semana
- ◯ 4 horas por semana
- ◯ 2 horas por semana

05 - Qual é a sua maior dificuldade na aprendizagem de Inglês? *

- ◯ Falar e Ouvir (parte oral da língua)
- ◯ Ler e Escrever (parte escrita da linguagem)
- ◯ Gramática (entender as regras, detalhes, exceções)
- ◯ Outro

Será enviada uma cópia das suas respostas por email para o endereço que forneceu.

SUBMETER

Annex 2 – Questionnaire 2

Proficiência em Língua Inglesa - Pesquisa de Doutoramento - Artur Campos (UNL/UNIT) - Tempo de Resposta: 5 minutos

*Obrigatório

Nome *

A sua resposta

Idade *

A sua resposta

Curso Universitário: *

A sua resposta

1 – I have been working in Barcelona….. *

- ◯ since ten years.
- ◯ for ten years.
- ◯ by ten years.
- ◯ ten years ago.

2 – Jennifer is…….her older sister. *

- ◯ not so good in Mathematics than
- ◯ not good in Mathematics than
- ◯ not as good in Mathematics as
- ◯ not good in Mathematics as

3 – They are…….in a famous festival tomorrow. *

- ◯ going playing
- ◯ play
- ◯ to play
- ◯ going to play

4 – Qual a forma correta da frase abaixo: marque a opção correta. *

- ◯ Is this your car ?
- ◯ Is these your car ?
- ◯ Is this yours car ?
- ◯ Are this your car ?

5 – I wish you..... *

- ◯ haven't said that.
- ◯ didn't said that.
- ◯ don't say that.
- ◯ hadn't said that.

6 – They usually go to university..... *

- ◯ under foot.
- ◯ on foot.
- ◯ by foot.
- ◯ of foot.

7 – Your girlfriend……. *

- ○ is more old than you.
- ○ is older like you.
- ○ is more older as you.
- ○ is older than you.

8 – He hasn't got…….....time for a nice meal on weekdays. *

- ○ much
- ○ many of
- ○ few
- ○ lot

9 – I wouldn't say that to them ……. *

- ○ if I was you.
- ○ if I were you.
- ○ if I would be you.
- ○ if I am you

10 – The mechanics didn't understand the problem at the beginning but then.....and the engine issue was solved in 10 miuntes. *

- ◯ we explained it them
- ◯ we explained them
- ◯ we explained them it
- ◯ we explained it to them

SUBMETER

Nunca envie palavras-passe através dos Formulários do Google.

Annex 3 – Questionnaire 3

Índice de Prontidão à Tecnologia - Pesquisa de Doutoramento - Artur Campos (UNL/UNIT) - Tempo de Resposta: 3 minutos

*Obrigatório

Nome: *

A sua resposta

Idade: *

A sua resposta

Curso Universitário:

A sua resposta

1 – A Tecnologia me deixa mais produtivo em experiências de contexto educacional: *

- ◯ Discordo Totalmente
- ◯ Discordo
- ◯ Neutro
- ◯ Concordo
- ◯ Concordo Totalmente

2 – Gosto de tecnologias que permitam adequar elementos pessoais às necessidades de aprendizagem: *

- ◯ Discordo Totalmente
- ◯ Discordo
- ◯ Neutro
- ◯ Concordo
- ◯ Concordo Totalmente

3 – Acho bom estudar no formato 'online' porque não fico limitado ao horário regular da aula: *

- ◯ Discordo Totalmente
- ◯ Discordo
- ◯ Neutro
- ◯ Concordo
- ◯ Concordo Totalmente

4 – Eu percebo que tenho menos problemas que outras pessoas ao lidar com tecnologias para fins educacionais: *

- ◯ Discordo Totalmente
- ◯ Discordo
- ◯ Neutro
- ◯ Concordo
- ◯ Concordo Totalmente

5 – Eu acho que novidades tecnológicas são mentalmente estimulantes para mim: *

- ◯ Discordo Totalmente
- ◯ Discordo
- ◯ Neutro
- ◯ Concordo
- ◯ Concordo Totalmente

6 – É constrangedor mostrar desconhecimento com aparelhos informáticos em frente à outras pessoas: *

- ◯ Discordo Totalmente
- ◯ Discordo
- ◯ Neutro
- ◯ Concordo
- ◯ Concordo Totalmente

7 – Com a facilidade da internet, o conteúdo da aula poderia ser entregue online e o professor funcionar como um mediador de dúvidas e estimulador de debates em sala: *

- ◯ Discordo Totalmente
- ◯ Discordo
- ◯ Neutro
- ◯ Concordo
- ◯ Concordo Totalmente

8 – Muita tecnologia envolvida tem distraído as pessoas a um ponto que está se tornando prejudicial: *

- ◯ Discordo Totalmente
- ◯ Discordo
- ◯ Neutro
- ◯ Concordo
- ◯ Concordo Totalmente

9 – A tecnologia diminui a qualidade das relações humanas porque reduz a interação entre as pessoas: *

- ◯ Discordo Totalmente
- ◯ Discordo
- ◯ Neutro
- ◯ Concordo
- ◯ Concordo Totalmente

10 – Não acredito em formas de aprendizagem sem o elemento humano – é impossível aprender só com computadores e/ou celulares/telemóveis: *

- ◯ Discordo Totalmente
- ◯ Discordo
- ◯ Neutro
- ◯ Concordo
- ◯ Concordo Totalmente

SUBMETER

Nunca envie palavras-passe através dos Formulários do Google.

Annex 4 – Questionnaire 4

Feedback após a Difusão dos Apps aos participantes - Tempo de Resposta: 1 minuto

*Obrigatório

Nome: *

A sua resposta

Curso Universitário:

A sua resposta

01 - Qual(is) aplicativo(s) você usou no seu telemóvel/celular ? Babbel, British Council, Busuu, Duolingo, Speak English Daily....ou nenhum ? *

A sua resposta

02 – Na demonstração em Powerpoint feita sobre a pesquisa, a explicação quanto aos objetivos e à utilização dos aplicativos foi _____ . *

- ◯ Complexa
- ◯ Confusa
- ◯ Adequada
- ◯ Estimulante

03 – Após 60 a 90 dias da difusão dos aplicativos a você participante, como está o seu uso dos apps ? *

- ◯ Continua igual ou até mesmo Aumentei
- ◯ Diminuiu mas vou retomar o uso dos apps
- ◯ Diminuiu bastante / praticamente Abandonei
- ◯ Nem cheguei a instalar os apps

04 – Qual foi (ou tem sido) a maior dificuldade em usar o celular / telemóvel como ferramenta de aprendizagem ? *

- ◯ Tela Pequena
- ◯ Conexão de Internet ruim
- ◯ Estranhamento com a metodologia dos apps
- ◯ Não gosto

SUBMETER